80 micro

the magazine for TRS-80* users

OCTOBER 1985
USA $4.00
CANADA $4.50
A CWC/I PUBLICATION

Reviewed in This Issue:

- DoubleDuty
- 3 Windows Programs
- Backrest
- Tournament Chess
- The Business Graphics Pak

TIME TO BUY A HARD DISK!

80 Tells You Why, Where, And How

CONQUERING INCOMPATIBILITY

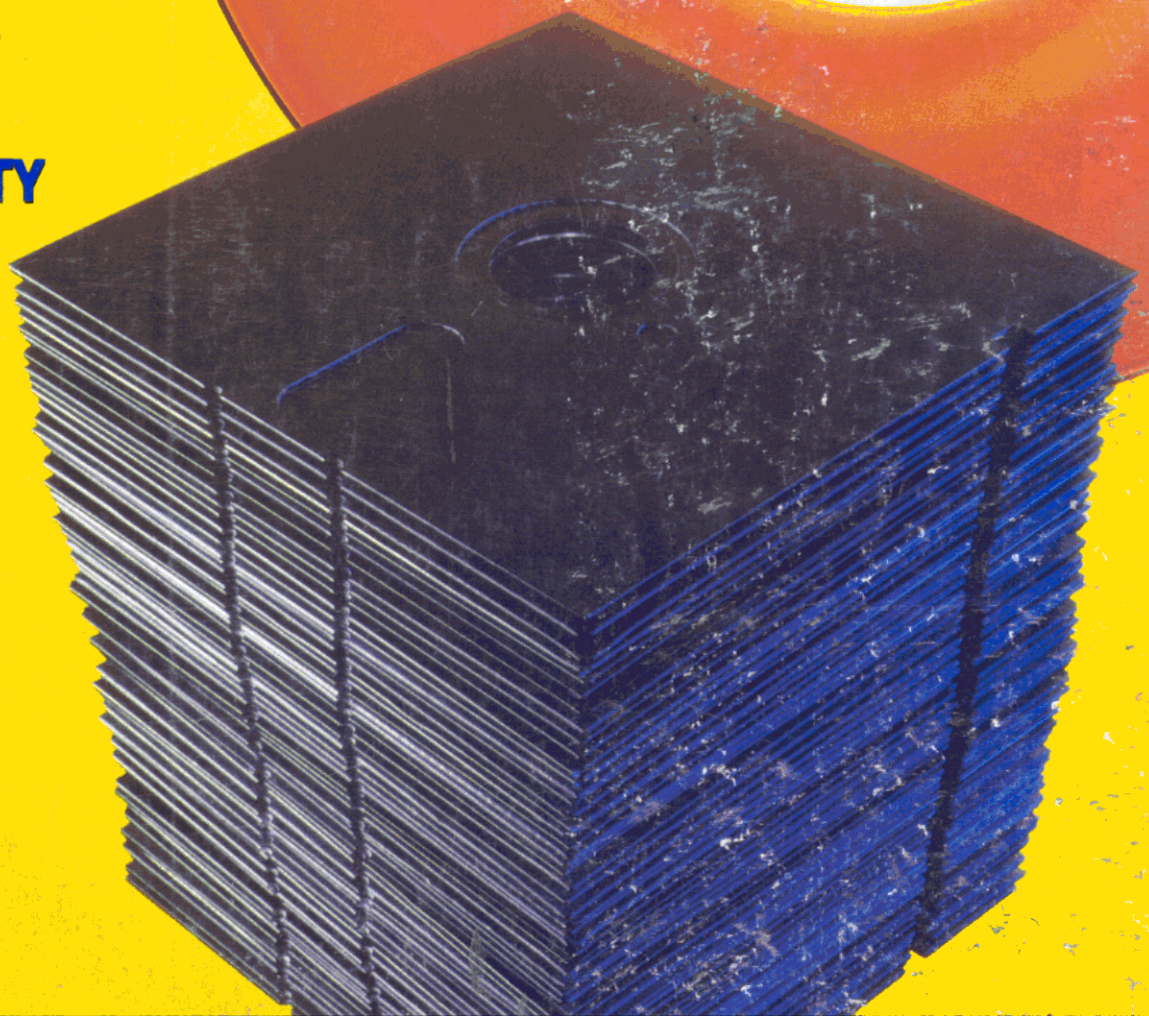
Let Your Programs Share Data Files

SUPER UTILITY GOES MS-DOS

Powersoft Takes on The Norton U's

DEAD BUT NOT GONE

How to Restore Model 4 Files



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WW II GATO-Class Submarine Simulation

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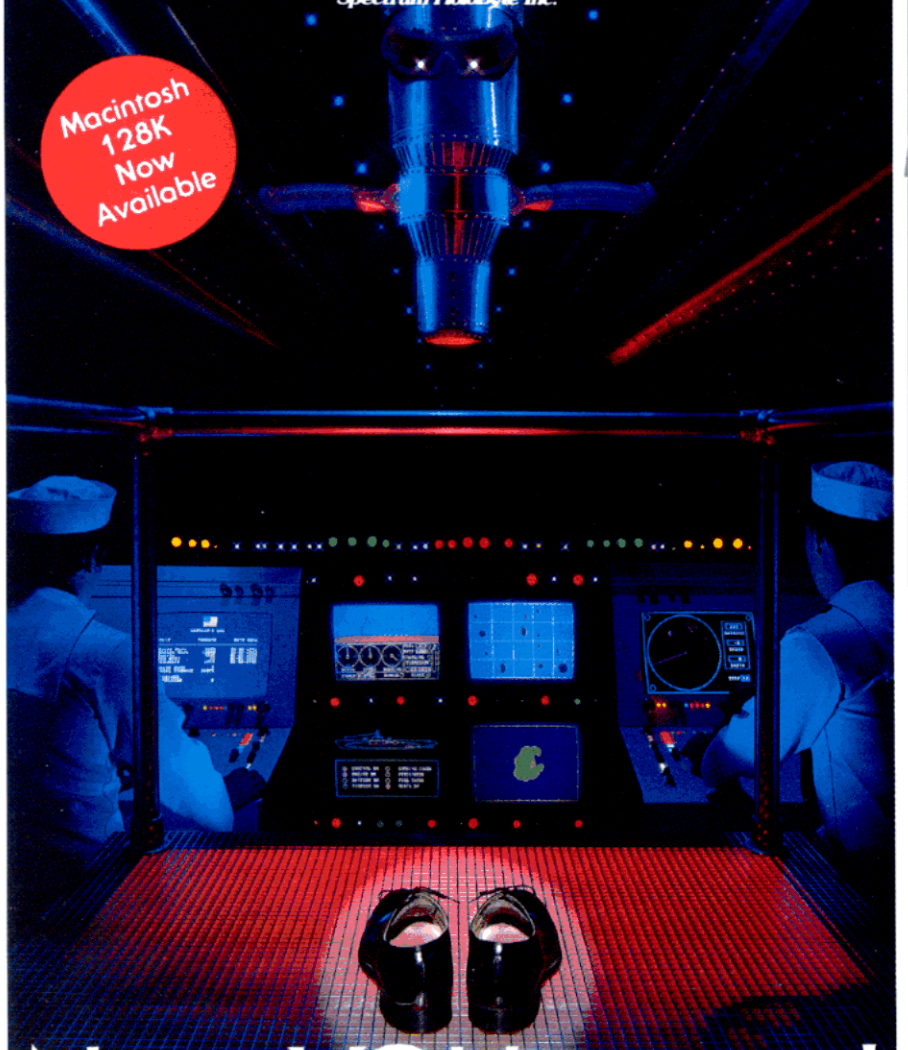

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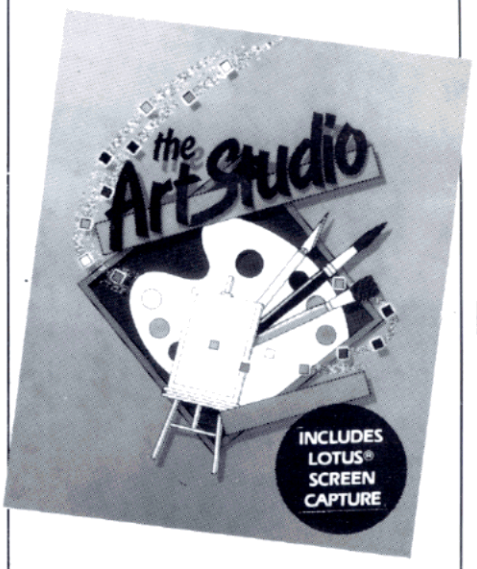

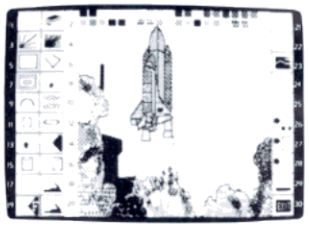

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** MSCRIPT **
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DOSPLUS IVa / MSCRIPT / MTERM Package Deal
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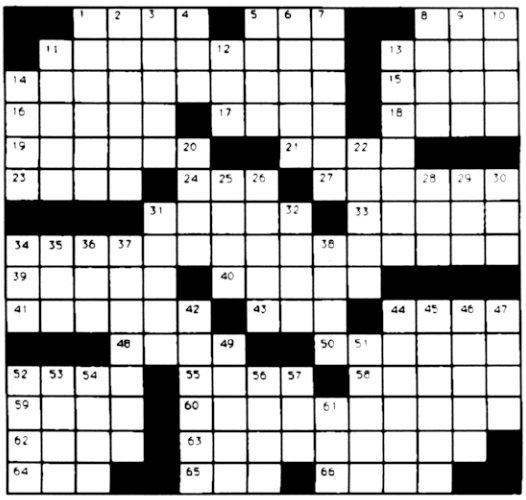
TONS O' PUNS

ACROSS
1 - Syria's neighbor
5 - Don Ho's wife?
8 - Computer chips, for short
11 - Before computer's locator?
13 - Pay attention, with "out"
14 - Commodore's commodore?
15 - Part of ROM
16 - Rajah's wife
17 - Certain disease fighters
18 - Go in the water
19 - City in Denmark
21 - Type of dragon?
23 - Sailor's drink?
24 - Part of many German names
27 - Follows instruction path
31 - Computer language
33 - City in Bolivia
34 - Damon Runyon Stars?
39 - "____ Joe's"
40 - Smart ____
41 - Tectonic ____
43 - Civil War General
44 - A ____ New Year's Eve party
48 - The Thin Man's dog
50 - Of inscribed pillars
52 - Funny person
55 - Landed
58 - Like Goofy
59 - Neighborhood
60 - Your local TV repairman?
62 - 1 QUARTER 1 ____
63 - Wreck an Irish rental car?
64 - Turf
65 - Aykroyd and Chases's old turf: abbr.
66 - Harem rooms

DOWN
1 - Laundry worker
2 - Member of a governing board
3 - Farmer's land
4 - Sine ____ non
5 - "Woe ____!"
6 - Movers and shakers
7 - Adjective for a knave
8 - Scottish island
9 - Winter malady
10 - Type of terrier
11 - Meadow, in Mexico
12 - Average value, for short
13 - What the bass sings?
14 - Type of plane, for short
20 - Aspect of Civil Defense: abbr.
22 - Hard as ____
25 - U.S. hazard watchdog
26 - Actor MacGinnis of "Curse of the Demon"
28 - Type of stick
29 - Punch the wrong button
30 - Short emergency!
31 - Computer diet?
32 - Indian
34 - Aug. follower
35 - "2001" computer
36 - ____ glance
37 - How a computer user lives?
38 - Super programmers
42 - Microprocessor memories
44 - Classifications
45 - Fire and tornado ____
46 - Bolivian capital
47 - Greenwich Village adjective
49 - Actor Delon
51 - Helped (with "over")
52 - Hats
53 - Woody's kid
54 - Another part of ROM
56 - "____ be a pleasure!"
57 - However, for short
61 - So that's it!



System requirements: 48k—TRS-80* I, III, & IV; IBM* PC or compatible (e.g., Tandy 1000*) Apple*IIs; Commodore*; Atari*.

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80 formats its program listings to run 64-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

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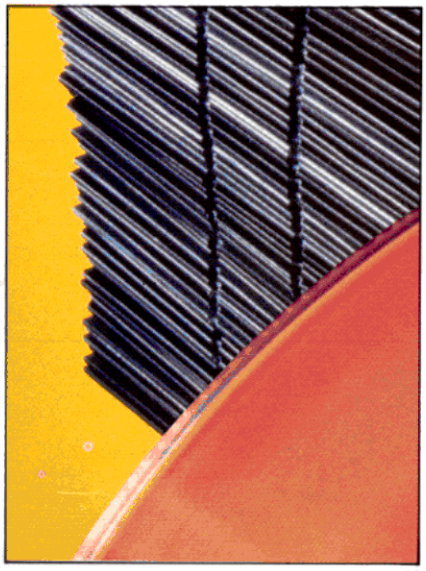
October 1985 80micro



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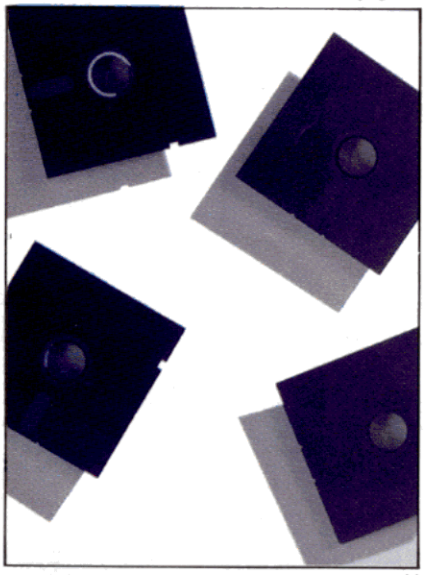

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On the Cover

40. **Hard Decisions** *by Vincent E. Meyer*
What you should know before you buy a hard disk.

44. **Running Hard** *by Richard McGarvey*
Why your DOS can make or break your hard disk system.

52. **Have Data, Will Travel** *by Dave Rowell*
Getting software written on one computer to run on another. (Models I, III, and 4; Load 80; Models 1000, 1200, 2000, 100, and 200)

58. **Files from the Crypt** *by Raymond C. Boggs*
A second chance for removed or purged files. (Model 4; Load 80)

88. **Utilities Included: Comparing Super U and The Norton Utilities** *by Dave Rowell*
In search of the better MS-DOS disk zapper.

Features

62. **Key Notes** *by Clifford I. Knight*
Play variations on your Model 4's function keys with this easy-to-install filter. (Model 4; Load 80)

70. **Next-Generation Software** *by James W. Wood*
Designer genes for your computer. (Models I, III, and 4; Load 80; Models 1000 and 1200)

76. **Patch Maker** *by Sean E.P. Robinson*
The right way to manage patches. (Model III; Load 80)

Departments

6. **Load 80 Directory**

8. **Mail-Order Maxims** *by Daniel Harmon*

12. **Side Tracks** *by Eric Maloney*

14. **Input**

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LOAD 80

Load 80 gathers together selected programs from this issue of *80 Micro* and puts them on a magnetic medium for your convenience. It is available on tape or disk, and runs on the Models, I, III, and 4.

Using Load 80 is simple. If you own a tape system, load the Load 80 tape as per the instructions provided. If you own a Model I or III disk system, you boot the Load 80 disk and transfer the files to a TRSDOS system disk according to simple on-screen directions. If you own a Model 4, copy the Model 4 programs from the Load 80 disk to your TRSDOS 6.X disk using the COPY command.

Not all programs will run on your system. Some Model III programs, for instance, will run on the Model 4 in the Model III mode, but not in the Model 4 mode. You should check the system requirements box that accompanies the article to find out what system configuration individual programs require.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly subscriptions to Load 80 are $199.97 for disk, or $99.97 for cassette. Individual loaders are available on disk for $21.47 or on cassette for $11.47, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to Load 80, 80 Pine St., Peterborough, NH 03458.

Directory

Restore
Article: Files from the Crypt (p. 58).
System: Model 4, 64K RAM ALDS editor/assembler.
Retrieve killed files.
Language: Assembly.
Cassette filespec: RESTOR (object code).
Disk filespecs: RESTORE/SRC (source code), RESTORE/CMD (object code).

Filter
Article: Key Notes (p. 62).
System: Model 4, 64K RAM, ALDS editor/assembler.
Function key filter.
Language: Assembly.
Cassette filespec: PF (object code).
Disk filespecs: PF/SRC (source code), PF/FLT (object code).

Genetics
Article: Next-Generation Software (p. 70).
System: Models I and III, 16K RAM cassette, 32K RAM disk; Model 4, 64K RAM.
Recreate genetic experiments.
Language: Basic.
Cassette filespecs: B, C.
Disk filespecs: GENETICS/BAS, GENETIC4/BAS.

Patcher
Article: Patch Maker (p. 76).
System: Model III, 32K RAM.
A patches management program.
Language: Disk Basic.
Cassette filespec: D.
Disk filespec: PATCHER/BAS.

File Chop
Article: The Next Step (p. 100).
System: Model 4/4P, TRSDOS 6.2, EDAS editor/assembler.
Condense random-access files.
Languages: Disk Basic, Assembly.
Cassette filespecs: CHOP (object code), E.
Disk filespecs: CHOP/SRC (source code), CHOP/CMD (object code), FILECHOP/BAS.

Taxes
Article: Spreadsheet Beat (p. 106).
System: Model 4, 64K RAM, Multiplan.
Track expenses and estimate federal income tax.
Disk filespecs: TAXEST85/MP, TRAVEL85/MP, TAXDED85/MP.

Diskbug
System: Model III, 32K RAM, TRSDOS 1.3.
Disk debugging utility.
Language: Assembly.
Cassette filespecs: DKSBUG (object code), CHART (object code), LOCATE (object code).
Disk filespecs: DSKBUG/CMD (object code), LOCATE/CMD (object code), CHART/CMD (object code).

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Mail-Order Maxims

by Daniel Harmon

Guidelines to making successful mail-order purchases.

Mail-order business is as American as apple pie, but you might encounter problems not found in over-the-counter merchandising. Apart from the obvious fact that you can't examine a product until it arrives, you might receive goods flawed because of negligent manufacture, inspection, or handling. And if you find yourself slighted, accidentally or maliciously, you have to contend with a stranger hundreds of miles away in a different legal jurisdiction.

That doesn't mean you should shun the mails. A shrewd buyer can take steps before ordering and after delivery to ensure satisfaction. And the mail-order branch of the microcomputer industry does lie within reach of our system of justice.

Under the Uniform Commercial Code, a buyer can reject a product "within a reasonable time" if, after usage, it evidences a breach of warranty. What's a reasonable time? That would be up to a court to decide. Just make sure you bring any problem to the seller's attention as soon as you discover it.

An Ounce of Prevention

First, you should follow these steps when you order a product by mail:

- Read the advertisement's fine print and know exactly what you're buying. If you can't find details you want in the ad; if some of the published information seems unclear, contradictory, or wrong; or if you don't understand the meaning of a disclaimer, phone or write the seller for clarification before placing your order.
- Ask in advance about the seller's return policies. Some houses charge "restocking" fees; some require that the buyer pay return postage.
- Never send a cash payment by mail.
- When your order arrives, save all boxes, wrappings, instructions, and other papers until you're sure the product is OK. If it was damaged or lost in transit, carriers usually will make amends. United Parcel Service, for example, either sends someone to check the package or returns it to the shipper at no cost to you. If the U.S. Postal Service handled the shipment, you can lodge a complaint with your local post office or contact Consumer Advocate, U.S. Postal Service, Washington, DC 20260.
- Never return a damaged product without communicating with the seller first. True, you might save time by returning it immediately, and you might receive a replacement or refund by return mail, but you could also create complications for yourself.

How to Complain Effectively

What happens when you've paid your money, taken delivery, and you wind up with shoddy merchandise or an item you don't want? What happens if you send in your check and the days turn to weeks, the weeks to months, and still you receive nothing?

You're not at the seller's mercy; you do have recourses. But before you take action, remember that it's most unlikely that you're dealing with a crook. The U.S. Office of Consumer Affairs estimates that consumers resolve 88 percent of their problems simply by contacting the seller or the seller's supervisor. Mail-order merchants generally aren't out to steal people's money, they're out to do business.

If you do run into a problem, you should first write a letter to the company's president or consumer contact. Your letter should include the dates you ordered and received the item and identify the product by model name/number and serial number. Detail the problem and ask for the form of satisfaction you deem appropriate: replacement, refund, or substitution. Attach copies, not originals, of the advertisement that attracted you and of receipts, warranties, canceled checks, or other pertinent documents.

Bear in mind that it won't hurt, and might help, to squelch your irritation and keep the letter's tone friendly. The person you're writing probably isn't the person who caused your woes, but one who can expedite a remedy.

Unless the seller specified that delivery might take longer, the law requires that vendors deliver merchandise within 30 days of the order. If a company fails to deliver within the allotted time, you have the right to cancel your order at no cost. If you exercise that right, the seller has seven days to refund your money or credit it to your charge account.

Note that when you negotiate mail-order problems, the last thing you should do is threaten to "turn the matter over to my lawyer." Hiring a lawyer should be your final resort. Lawyer's fees aren't cheap, and winning your case won't necessarily exempt you from having to pay costs.

Keep copies of all correspondence to and from the seller.

Wait three weeks. If the matter isn't settled, try a second letter, repeating your complaint and declaring that if you don't get immediate satisfaction, you'll notify the deputy chief postal inspector in the vendor's home region.

For the vendor, this now becomes serious business. The U.S. Postal Service has a nationwide law enforcement arm authorized to investigate mail fraud. The Postal Service can cut off mail deliveries to a vendor's address. If the Postal Service convicts a seller of mail fraud, he could face a stiff fine and possibly jail.

The government is most likely to launch a full investigation when it receives numerous complaints against a seller. Moral: Don't hesitate to report a truly serious problem. If you're really up against an unscrupulous dealer, yours could be the complaint that brings Uncle Sam into the action.

Other consumer defenders include the Mail Order Action Line of the Direct Marketing Association (6 E. 43rd St., New York, NY 10017). This commercial trade association follows up complaints by contacting vendors. It has no power of enforcement, though.

Better Business Bureaus and state or local consumer protection offices might be able to help you, but it can be confusing to find the right place to make your particular complaint. The U.S. Office of Consumer Affairs' *Consumer Resource Handbook* lists the appropriate agencies. You can get a free copy by writing to Handbook, Consumer Information Center, Pueblo, CO 81009.

Finally, if you're having a problem with an *80 Micro* advertiser, you might want to send a copy of your complaint to *80 Micro*, 80 Pine St., Peterborough, NH 03458. ■

Daniel E. Harmon is the managing editor of The Lawyer's PC *newsletter, P.O. Box 1108, Lexington, SC 29072.*

Illustration by John Pirman

Circle 91 on Reader Service card.

DOTWRITER printed these on an Epson MX-80.

See What You Can Do With DOTWRITER!

DOTWRITER lets you create spectacular, eye-catching signs, invitations, letterheads, large sideways banners, catalogs, or even books. It is just what you need to turn your dot-matrix printer into a versatile typesetting machine. And it is available for your TRS-80 **Model 4/4P** (yes, in native mode), as well as for the Models I and III.

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DOTWRITER includes the printing program, complete documentation, and fourteen useful typefaces (60 to 90 characters per typeface). We will include the 170-page Letterset Reference summary at half-price ($10.00) with your order.

To use DOTWRITER, just write your text with any popular TRS-80 Word Processor (such as ALLWRITE or SuperScripsit), add the necessary formatting commands, and DOTWRITER will do the rest.

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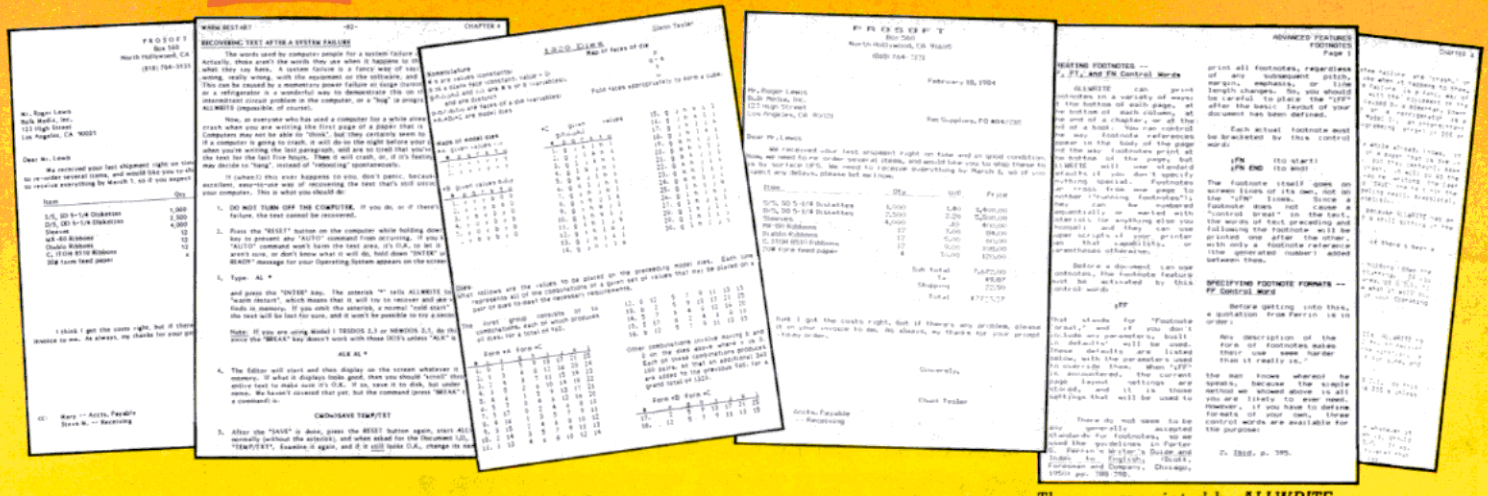

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ALLWRITE will save you time and let you produce the highest-quality, most professional-looking letters, term papers, and reports available on a micro-computer.

Allwrite Can Save You Time!

Reads a 25,000 character file (10 printed pages) from disk in SIX SECONDS . . . does a global search-and-replace in FOUR SECONDS . . . outruns even the fastest popular micro-printer.

ALLWRITE'S Screen Handling Makes Word Processing Easier Than Ever

Change text width at any time; wide lines shift left and right as you type. ALLWRITE preserves double-blanks between sentences, uses the entire screen for text, and displays a complete Status Screen at the touch of a key. Scroll by line, partial screen, full screen, to top or end of file, or to any marked point. Move cursor by character, word, tab, line, or screen.

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ALLWRITE shows you where you forgot to turn off underlining, boldface, italics, or double-width. Special on-screen Preview feature shows page breaks and page layouts . . . including underlining and boldface. In "Summary" mode, ALLWRITE quickly flags formatting errors without wasting time printing all the text. These standard features make document preparation faster and easier than ever!

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There is no upper-limit on document size with ALLWRITE, because it chains files *backwards* as well as forwards, even across diskettes. Switch from one chained file to another in less than six seconds by pressing two keys. Select portions of other files for inclusion at print time . . . great for stock paragraphs.

ALLWRITE salvages text from bad disks! If a sector goes bad, you won't lose the entire file, because it

TAKES FULL ADVANTAGE OF YOUR MODEL 4.

The model 4 version of ALLWRITE uses **the entire 80-by-24 screen.** On a 64K machine, you can edit **over 34,000 characters** of text. On a 128K machine, you can edit **THREE FILES AT THE SAME TIME!** The second and third files can be over 32,600 characters each, for a total of **almost 100,000 characters** of text in memory.

will skip bad sectors, **read the rest of the file,** and then show you where the lost text belongs. This advanced error recovery turns a disaster into a feeling of profound relief.

User-Definable Soft Keys Reduce Typing Time

You can store **22 phrases or commands at a time into "soft-keys,"** then press just two keys to retrieve them. This makes frequently-used phrases and formatting controls *a snap to use.* You can store these definitions on disk and build a library of hundreds of pre-programmed keys to fit every one of your applications.

Our specially-designed templates fit right on your keyboard to let you see your settings at all times. Each template is also a Reference ("Cue") Card, so it is always right in front of you when you need it, without using up valuable screen space.

ALLWRITE Is Easy To Learn

ALLWRITE's commands and control keys are easy to remember because they use the first letters of common English words: 'CE' stands for 'Center,' 'Search' and 'Replace' do just that, and so forth. The **on-line HELP menu** offers over fifty screens of topics.

ALLWRITE's superb documentation will get you started quickly. Portions of it are designed for beginners, with every feature clearly explained in step-by-step tutorial style. Since you won't always be a beginner, other parts of the book offer advanced topics. There is a cross-reference summary chapter, a 14-page comprehensive index, and a detailed Table of Contents. We've been developing computer programs and manuals for over 23 years, and understand the importance of good documentation.

ALLWRITE works with all major DOS's on Models 1, 3, and 4/4P.

PROSOFT'S On-Going Customer Support

Perhaps the best reason of all for having ALLWRITE is the continuing support we offer you: friendly, expert, direct support that is unsurpassed in the micro-computer industry.

Note to students: with its Footnote, Table of Contents and Index features, **ALLWRITE is ideal for your reports and Term papers.**

Note to teachers: ALLWRITE makes it very easy to generate multiple-choice exams *and* answer keys. Ask for free instructions when ordering.

"ALLWRITE is a professional system that sets a new standard in word processing. It's powerful and easy to learn and use."
80 MICRO, Nov., 1984

Customer Comments

"This is the best software package I have ever received . . . superb, easy to use, fast, and has more features than the business word-processor at the office." (E.R.L.)

"Your company and products have to be one of the strongest factors I can think of for keeping me with the TRS-80!" (J.R.H.)

"NEWSCRIPT is the Cadillac of word processors. ALLWRITE is the Mercedes Benz!!" (B.E.)

". . . a very readable manual." (D.S.)

BENEFITS OF OWNING ★★ ALLWRITE ★★

If Word Processing is important to you, PROSOFT's ALLWRITE is the best choice you can make. The clean, professional appearance it adds to your letters and reports will make an excellent impression on people. We will be happy to send you free print samples so that you can see for yourself how good ALLWRITE will make you look.

You probably know that quality word processors for CP/M and the IBM-PC sell for $300–500, and they don't have ALLWRITE's capabilities or speed . . . or PROSOFT's proven, on-going support. Now, for a fraction of the cost of a new computer, you can have the most complete word processor of all. And you won't have the headaches of starting all over again with a new, different computer.

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ALLWRITE comes with just about every useful word processing feature . . . standard. Here are some highlights: excellent right-justified proportional printing on most printers having that ability; powerful Form Letter and Mailing Label preparation; Instant counts of words, characters, lines, changes; block Move, Copy, Delete, Putfile, Getfile, and List; delete by character, word, line, sentence, paragraph, or block; insert and one-key insert; great RS-232 printer support; accepts all 256 ASCII codes from keyboard; intermix pitches on same line (printer-dependent); 1.5 line spacing, 6, 7, 8, 12 lines per inch (printer-dependent); does multiple-columns on all printers; perfect alignment of hanging indents; variables, logic statements, conditional printing; wildcard Directories; integrated with Electric Webster and DOTWRITER for Models I, III, and 4 (these are sold separately); "Legal" line numbering; paragraph, list, and figure numbering; supports most popular printers (all "printer drivers" included); compatible with high-memory drivers; fully explains all DOS and ALLWRITE error messages; wildcard search-replace; tabs, search-replace, other settings remembered across files; word reversal; up to nine levels of boldface; flexible page titles; footnotes at bottom of page or end of document; Table of Contents and Index generation; and PROSOFT's unmatched text formatting and printing capabilities.

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You can order by phone or mail. For quickest delivery, call our Technical Support line. Please specify your TRS-80 model (I, III, or 4, 48K, at least two disk drives), and your printer(s). Our price includes normal shipping in the U.S. and Canada. The sooner you order, the sooner you will begin to benefit from the ALLWRITE! Word Processor.

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VisiCalc: A Legend In the Making

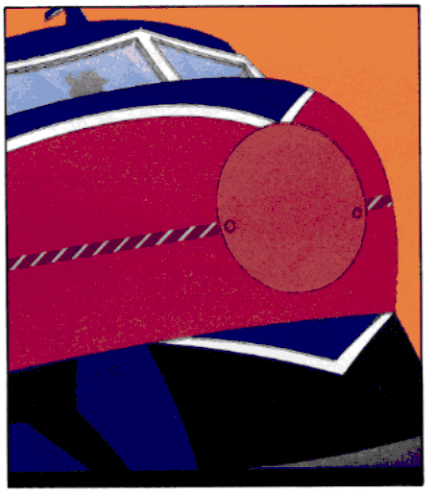
When Lotus bought Software Arts and subsequently killed VisiCalc, more than one old-timer sighed regretfully. VisiCalc practically put microcomputing on the map, and blazed the trail for today's behemoth spreadsheets. It also happened to be a terrific program, one that people will be using for years to come.

VisiCalc's demise made me think of a book I read recently called *The Sound of the City* by Charlie Gillett. It's an excellent history of rock and roll, with several illuminating chapters on the rise and fall of small record companies in the 50s and 60s. The parallel between the record and software industries isn't exact, but is close enough to be instructive.

The recording industry had, of course, been around for half a century, but got the shock of its life in the mid-50s when rock and roll stormed America. The big companies failed to respond to what they considered a fad, thus giving hundreds of entrepreneurs the chance to record important and successful artists. If you've got a good memory, you might recall such labels as Dolton, Keen, Del-Fi, Mustang, Era, Dore, Cadence, Philles, Monument, Legrand, Cameo/Parkway, Swan, Big Top, Laurie, and Roulette. All had top-rank performers and #1 hits; all are gone.

Like many of today's (and yesterday's) software companies, most of these smaller labels were poorly managed, or were one-hit wonders unable to sustain sales through new products. In short order, larger companies took away the best artists, gobbled up the more stable of the smaller outfits, and ran the unstable ones out of business. When the dust cleared, only a few of the upstarts—most notably, Warner, Atlantic, United Artists, and ABC—survived to join such mainstays as Columbia and RCA.

If the software industry follows this pattern of explosion followed by consolidation, we won't have to wait too long before it's overrun by Harvard MBAs in BMWs. The Lotuses, Microsofts, and Ashton-Tates will pluck the talent, and will be the only ones with the resources to introduce and market major new products. Following them will be a group of smaller companies filling special niches,



and trailing the pack will be a herd of hopefuls waiting for a break. The guys with weekend kitchen-table operations will have to look for another line of work.

Well, that's the free enterprise system for you. We should, however, recognize the good side. VisiCalc, like many of the great rock and rollers of the 50s, is now guaranteed the status of legend. Years from now, users will continue to circulate bootlegs. Collectors will eagerly seek original copies of the software and manual. Microcomputer historians will record that VisiCalc was a classic, a program that defined the overused words "elegance" and "simplicity."

I suppose there are worse ways to go. We'll see whether 1-2-3 bows out as gracefully when its time comes.

Rank	Computer	Percent
1	Model III	45.7
2	Model 4	33.3
3	Model I	29.3
4	CoCo	12.3
5	IBM PC, XT	12.3
6	Model 100/200	10.6
7	Model 4P	9.0
8	Model II	7.7
9	Pocket Computer	6.7
10	Apple	5.7
11	Commodore, VIC-20	3.7
12	Model 1000	3.3
13	Atari	3.0
14	Model 1200	2.7
15	Model 2000	2.3
16	Model 16	2.3
17	Compaq	2.3
18	LNW	2.0
19	Hewlett-Packard	1.9
20	Model 12	1.7
21	Eagle	1.7
22	Kaypro	1.7
23	Columbia	1.3
24	TI 99/4A	1.3
25	Timex-Sinclair	1.3

Table. Computer ownership among 80 Micro readers. Multiple answers accepted.

Angry 2000 Owners

Hell hath no fury like a computerist scorned. Since I explained in my May Side Tracks why we were discontinuing 2000 Plus (only 3.5 percent of our readers used Model 2000s), I've received a spate of letters from irate Model 2000 users. Our June Input section, in which I revealed the source of the data (our Reader Service card), stimulated another bushel of correspondence, most of which questioned whether numbers drawn from the card are valid.

"Reader Service cards are 'requests' for information for products which are advertised," wrote W. Aird Flavelle of Calgary, Alberta. "It appears that your sample of respondents is quite biased, and not truly indicative of the Tandy 2000 owners in your readership."

Well, we've received some more numbers, these from a random survey of *80 Micro* readers last March, and Model 2000 owners aren't going to be happy: The 2000 finished 15th. The only Tandy machines it beat out were the Models 16 and 6000, and it trailed such computers as the IBM PC and XT, the Apples, the Commodore and VIC-20, and the Ataris. (See the Table for ranking.)

The unfortunate fact is that the machine has not sold. Model 2000 owners have a fine computer, but not a popular one.

Model 1000 owners, by the way, can be heartened by the fact that our April Reader Service card results saw 1000 ownership jump to 8.1 percent, as opposed to 1.6 percent for the 1200 and 3.2 percent for the 2000. Obviously, the 1000 is the computer of choice for those interested in Tandy's MS-DOS line. ■

SPEECH

fun simple powerful

with the vs-100 voice synthesizer

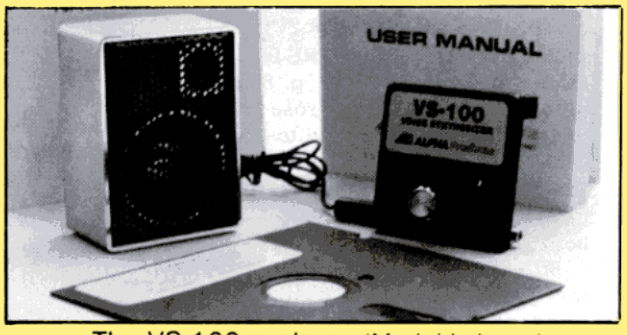
Check these features:

Talker 2.0 and Talker 4.0 software:

- ☑ Unlimited translation of English text to clear speech.
- ☑ Powerful video or keyboard echo can be switched on or off at any time.
- ☑ Can be used in BASIC with 2 new commands: PRINT* "I can talk" speaks any expression. PRINT! "Hello" speaks *and* prints on screen.
- ☑ Reads numbers up to 999 trillion.
- ☑ Speaks many abbreviations, such as Mrs., Mr., lb., oz., Co., etc.
- ☐ Walks the dog.
- ☑ Many control codes to tailor the system to your wishes. (Pitch, speed, etc.)
- ☑ Only 6¼K long.
- ☑ Talker relocates itself into available high memory. Compatible with any DOS (not CPM).

The VS-100 hardware:

- ☑ Same performance as very expensive units.
- ☑ Super efficient: About 50 bytes per sentence.
- ☑ Handsome speaker module included.
- ☑ Detailed 48 page manual.
- ☑ Ready to plug in and talk right away.
- ☑ Uses the famous Votrax SC-01 with 4 pitch levels and automatic inflection.
- ☑ Built in audio amplifier with volume control.



The VS-100 system. (Model I shown)

$69.95

Includes:
- VS-100 synthesizer
- Speaker
- Power supply
- Manual

Specify Model I, III, 4 or 4P.

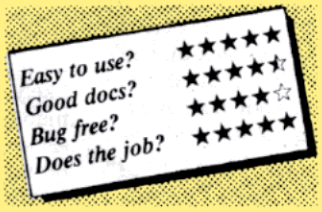
Model 4P needs short 50 pin extension cable 14.95

TEXT-TO-SPEECH SOFTWARE

- **Talker 2.0** for Models I and III On disk only..... 29.95
- **Talker 4.0** for Model 4. Includes Talker 2.0 for Model III mode. On disk only..... 39.95
- Text-to-Speech for tape users 19.95

Small Print: ● Model I: unit plugs into keyboard or expansion interface 40 pin bus. ● Model III,4,4P: unit plugs into 50-pin I/O bus. Model III VS-100 works with Model III,4,4P. Use our "Y-cables" (see next page) if your bus is already used.

See the detailed review in 80-Micro December 1984.



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"Doctor SIGMUND" will amaze you!

See Artificial Intelligence at work!

If you want to show off your computer, run "Doctor SIGMUND" and see their expressions as your TRS-80 has an intelligent conversation with you. If you have a VS-100 voice synthesizer, Sigmund actually talks back to you. Even YOU will be impressed. **$29.95**

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Sidetracked

I read "Lost Tribe of TRS-80 Users" (Side Tracks, July 1985, p. 8) with a touch of nostalgia that arose from remembering the same tone to The Exit Mode column in the final issue of *Microcomputing*. You bemoan that "the compound is much smaller than it used to be." How true.

80 Micro started as a magazine that was going to cover "the changing technology of home computers." Then came the Color Computer, which *80* covered until they could spin it off into another magazine. Results? Lost readers, lost advertising revenue. The same story with the Model 100, then came the Model 2000, from which you dropped the coverage as soon as you determined that the Reader Survey showed the number of owners stabilized at 3.5 percent of all readers.

The fact that there are fewer people reading the magazine should tell you that you aren't giving people what they want. In your efforts to stay with the mainstream TRS-80 users, you have sidetracked yourself into a dead spur. Yes, the Model 4 still lives, but you survive at the whims of Tandy, and grasp at the straw that they will continue to support the Model 4 family. Sure they will. Just like they supported the old screen printer and Level I blackjack. When the dollar has spoken, the ax will fall.

I'm not saying drop the Model I/III/4. I say expand! MS-DOS has the software writers and the hardware vendors to build *80* back up into the premier magazine in the microcomputing world. It's time for the "Lost Tribe" at *80 Micro* to get out of their shrinking little compound before the walls close in on them entirely.

Fredrick Keyser
Laredo, TX

BBS Success

Being in prison, a lot of my social life has been on BBSes. One of my favorite boards is the Conference Tree. It is a bit harder to use than other boards, but it's also a powerful tool, and the only system that deviates from the standard menu-driven BBS.

I've seen the Conference Tree use a "think tank" approach to a hardware project. Different ideas that were tried

took different branches on the Tree. The potential of the Conference Tree goes far beyond that of other BBSes.

Robert Hall
Stillwater, MN

Back-Up Tip-off

Dave Rowell's review of Flight Simulator (July 1985, p. 114) didn't cover the "gotcha" in making your back-up copy. If you try it on the Tandy 1000, your copy won't work and your master may be ruined. According to Microsoft, you must back up the program on an IBM or a Compaq. Customer Service did replace my program, and I made my back-up successfully on a Compaq portable.

Other than that, the program is "five star" as reported.

Darryl Boom
Huntington Beach, CA

Crosswords

I would like to comment about the problems raised by the reviewer of Hypercross/Supercross in the September 1985 issue (p. 29).

The disk error-handling is designed to verify the disk after formatting. It does not put an excessively difficult pattern in each sector. In an example quoted by the reviewer, a disk rejected by Supercross was later accepted when he tried to format it on his Tandy Model 2000. He assumes from this that his disk and the format routine in the Model 2000 are good. Did he verify this by any other test on the same disk? Many of the MS-DOS format programs do not do a thorough job of verifying disks after formatting and the disk he thinks was formatted OK may in fact have flaws.

If you have a speed-up modification you must run CFGMAKE/BAS to create a configuration file which will tell the program what speed clock you are running. If you don't do this, the machine may hang up or give format verify errors.

I agree that the program may hang up if you try to access a disk in a format other than the one selected. I have made some tests which indicate if the format is wrong if some parameters do not match. In the case of MS-DOS disks, Hypercross/Supercross will tell you what the format probably is. I could make it search through all the formats in the data base trying the ones that looked likely. However, it might find a partial match and leave the user with a false sense of security, when in fact, it would be scrambling the data in unexpected ways. I am still working on this one.

Mike Gingell
President, Hypersoft
Raleigh, NC

A Tool for School

At our school we have a Model III network as well as a Tandy 2000 for record-keeping. In addition, my husband uses a Tandy 2000 for his electronics business.

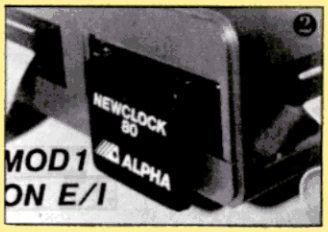
Your magazine does not usually address our needs. It seems to be mainly for hobbyists. Please reinstate 2000 Plus. We need information on printers, programs that will let us use IBM programs, business applications, and educational software. We need help on maintenance and troubleshooting.

Connie Acton
El Cerrito, CA

80 Micro's BBS is open 24 hours a day. It offers programs you can up- and download, special-interest groups, and a classified section. You can reach the board at 603-924-6985; UART settings are 300/1200 baud, 8-bit words, 1 stop bit, no parity.

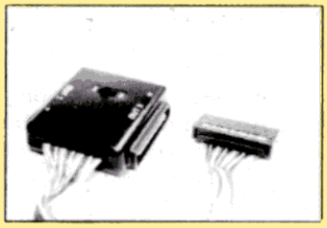
Send your correspondence to Input, 80 Micro, 80 Pine St., Peterborough, NH 03458.

Newclock-80 $69.95



The right time at the right price! Keep the time and date with quartz accuracy, even when your computer is off. The backup lithium battery (included) will last for over 2 years. Software on tape or disk, please specify. Use "TIMESET" once to set the clock. Use "SETCLK" to set your computer's internal clock (at power up) or use "TSTRING" so that the "TIME$" function reads the Newclock.
Connection: Model I: plugs into the keyboard or expansion interface. Model III: plugs into the 50-pin I/O bus. Compatible with all operating systems.

Printswitch $59.00

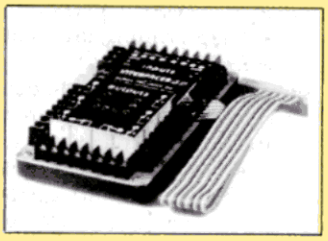


Do you have 2 printers? Get a Printswitch. Stop plugging and unplugging those printer cables. With the Printswitch, you can have 2 printers connected to your computer and you can select either one at the flick of a switch. Works with any printer, plotter, or device that uses the parallel printer port. Simply plug the 14 inch Printswitch cable into your computer, and plug your existing printer cables into the Printswitch. This is the nicest unit on the market. Superior quality board with gold plated edge connectors. For Models I,III, 4 and 4P.

Alpha Joystick $27.95

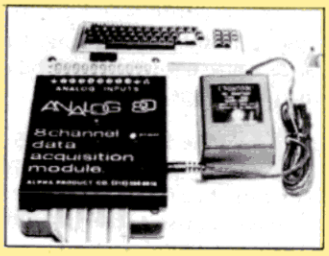
When it's time for fun, don't be without your Alpha Joystick. Do you know that most action games are Joystick compatible? Stop pounding on your keyboard and enjoy real arcade control. The joystick can also be used with BASIC programs; simply do J=INP(0) to read the joystick position (8 directions and fire button). Model I: plugs into keyboard or expansion interface. Model III, 4 and 4P: plugs into 50-pin I/O bus. The Alpha Joystick comes fully assembled and tested, ready to plug in and enjoy. (Specify Model I, or Model III,4).

Interfacer-80 $159.00



Low cost input and output device. The outputs consist of **8 relays** (rated 2 Amp @125V), easily controlled using "OUT" commands. For example, OUT 0,0 turns all the relays off. Eight LED's show the states of the relays. The **8 inputs** are optically isolated, so it's safe and easy to connect external devices (switches, sensors, thermostats, etc.). Simple "INP" commands read the inputs.
Connection: Mod I: 40 pin bus. Mod III, 4, 4P: requires 50-pin I/O bus converter ($39.95), plugs into 50-pin I/O bus. Comes complete with power supply, cable, and detailed manual.
(Up to 8 interfacers can be connected to your TRS-80 using our Y- cables).

Analog-80 $139.00



8 channel 8 bit Analog to Digital converter. Your TRS-80 can read voltages, temperatures, pressures, light levels, etc. • Input range: 0 to 5.1 Volts. • Resolution: 20mV. • Conversion time: 120 microseconds. In BASIC, you can take up to 100 readings per second. • Port address: selectable. Up to 8 Analog-80's can be connected to your TRS-80 for a total of 64 channels!
Connection: Model I: 40 pin I/O bus. Model III, 4, 4P: requires 50-pin bus adapter ($39.95).
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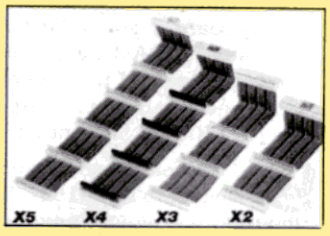
Special Cables



Disk drive extender cable (8")...C160:$9.95
Y-Cable for Mod I bus (40 pin): • **X2-40**...$29 • **X3-40**...$44 • **X4**...$59 • **X5**..$74
Y-Cable for Mod 3 & 4 bus (50-pin): • **X2-50**...$34 • **X3-50**...$49 • **X4-50**...$64
Disk drive cable (34 pin): • 2-drive...**C162:**$32 • 4-drive...**C163:**$45
Extension cable, 4 foot: • For printer and drive (34-pin)...**C165:**$22
• For Mod I bus (40-pin)...**C167:**$24 • For Mod 3 & 4 bus (50-pin)...**C169:**$28
Keyboard to E/I (40-pin, 8")...**C161:**$21 If this is confusing, send for our Cable Flyer.
Our cables are made with high quality gold plated connectors to ensure utmost reliability.

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We know that ordering by mail can sometimes be a hassle, but with Alpha, you are fully protected.
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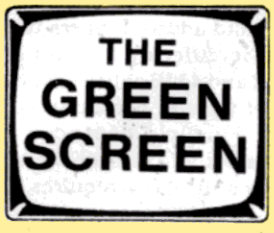
Green Screen $12.50



Do your eyes a favor, put on a green screen. Tens of thousands are in use for a good reason: they work. Contrast is enhanced and eye fatigue is greatly reduced. Our green screen is curved; it fits right on the face of the tube. (Fits Models I,II,III,4,12,16)

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Send your questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Pine St., Peterborough, NH 03458.

Q In the February 1985 *80 Micro* (p. 18), Bernadette M. Kennelly asked about speed-up chips for an Epson MX-80. I have no information about a chip, but I do know that by simply replacing the two 6 megahertz crystals with 10 MHz crystals, you can increase the speed considerably. I have been using my MX-80 with the 10 MHz crystals for some time with no problems. The increase in speed is noticeable, especially when doing printing that requires a lot of line feeds.

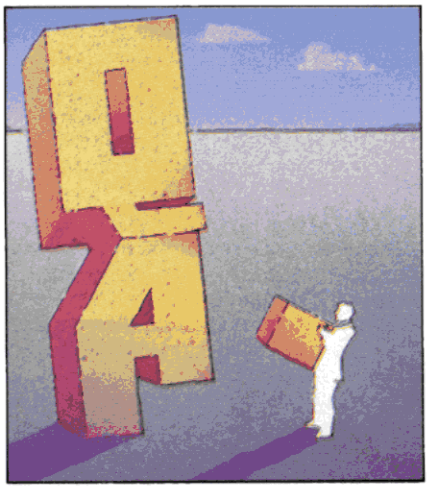
I might caution, though, that the crystals are soldered in place and you should be careful that you don't damage the pc board, especially when removing the existing crystals. Only an experienced person should do it. Also, of course, you might void the warranty. *(Charles Becker, Thousand Oaks, CA)*

A Thanks for writing. Has anyone else tried this method of increasing printer speed?

Q In the February 1985 Feedback Loop (p. 18), C.G. McProud asks if anyone has figured out how to convert a Model I to use 4164s instead of 4116s. I've done quite a few of these conversions. You get 48K and nearly 2K between ROM and keyboard if you want it. Also you can switch to RAM instead of ROM. If you are interested in this conversion, contact me. I've been thinking of writing it up.*(Bob Klaim, Sylvania, OH)*

Q Two years ago, I modified my Model I to use 4164s. My modification did not require any cut traces. I did, however, bend the leads on three pins and added jumpers to compensate for the differing pinouts between the 4164 and 4116 chips. I modified the chip select logic to permit access to the top 32K. Finally, I expanded the address multiplexer to provide the additional addresses the 4164 requires. I did this all without additional parts, except for the chip select logic, which required one transistor and two resistors.

Not all 4164s are created equal. One subtle difference between vendors in-



volves the number of refresh cycles each part requires. The memory refresh scheme used in the Model I generates 128 refresh cycles. Consequently, chips requiring 256 refresh cycles cannot be used. At the time I modified my machine, I used OKI RAMs. I don't know which manufacturers currently offer which versions of 64K chips.

This modification would only be feasible on a Model I without any expansion interface. Any RAM decode logic in the interface would have to be disabled. When I later added a MicroMint expansion kit, I deleted all RAM decode logic there. *(W.Lloyd Piper, Kokomo, IN)*

A It seems that there are many ways to convert your Model I to use 4164 RAM chips, but all require experience with electronics.

Q I would like to know if there is a way to recover lost documents using cassette Scripsit.

I have found that if I press the break key to stop a save to tape, the letters BK appear on the screen and I cannot get control of the system again. All the keys lock up, and I must reload the program tape. This means I've lost the document on the screen.

The local R/S people say I should not break a save or load, but should let the tape run to its end and then press break, but this does not always work. Do you have any suggestions?*(Vincent B. Cordisco, Bristol, PA)*

A That's a new one on me. Can anyone else help?

Q I am interested in using two external disk drives with my Model 4P. Can I do it? *(Robert C. Leaf, Dayton, OH)*

A The problem is that the 4P wasn't supposed to have external drives, so the designers left out the necessary circuit traces and support chips for the extra two drives. If you have the technical savvy, you could open up your computer and hand-wire the necessary chips and jumpers so that the internal drive connector pins for the two external drives are properly connected to the floppy disk controller chip. Complicating the proceedings (and this is why I am not giving more explicit directions) is that there are two main printed circuit boards for the Model 4P, one with all the support chips and a rather simple method of achieving what you want, and one requiring much more ingenuity and work.

Rather than doing this yourself, I suggest you have the modification done by the professionals at either Aerocomp (Redbird Airport, Building 8, P. O. Box 24829, Dallas, TX 75224, 214-339-8324) or The Alternate Source (704 Pennsylvania, Lansing, MI 48906, 517-482-8270). The upgrades are about $100 (call for exact prices and to tell them your computer is on the way). As long as you are sending out your computer, you might as well consider adding the extra 64K bank, if you don't already have it. Both companies handle that installation as well.

Q I have a Daisy Wheel II printer and have been trying to find out how I can remove the line feed either with a switch or permanently. Tandy said to change the ROM, which I did for $64, and I still have the same problem. The salesman said to use ESC/control-U when I turn the printer on, but it still doesn't work. I also have the 15 character-per-inch wheels and would like to use them, but Tandy directed me to a page in my manual that does not even exist. Do you know of any printer driver programs for the 16-bit WordStar and the Daisy Wheel II?

I own an AT&T 6300 and am very happy with it. I like Tandy hardware but gave up on the company. I started out with a Model III in 1981 and then went to the 4 in 1984. Our TRS-80 group had 30-odd members with Tandy computers

and is now down to four; the rest have moved to other machines because of Tandy's lack of support.

The straw that made me sell the Model 4 was when I bought CP/M + and found out it could not be double-sided and that it could not read any other format. *(Gil Seiler, Santa Rosa, CA)*

A: Before you condemn Tandy for their lack of support, have you tried getting AT&T to help you to configure their computer to not send the extra line feed? After all, if you expect Tandy to tell you how to configure their printer for other computers, shouldn't you also expect other computer manufacturers to tell you how to configure their computers for Tandy printers? And have you talked with Microsoft about why they made their operating system automatically add a line feed to every carriage return instead of making it optional as it is with TRSDOS 6 and LDOS 5?

Unfortunately, the Daisy Wheel II is designed to operate with the Radio Shack computer line, all of which require that the printer add a line feed to every carriage return it received. (This was before they produced an MS-DOS machine; now that they do, their new printers will have a switch to let you enable or disable the line feed to every carriage-return routine.) According to my sources, there isn't a ROM upgrade for the Daisy Wheel II, although there is one for the DWP-210 that makes it MS-DOS-compatible.

The only solution I can think of is to force WordStar to add a reverse line feed to every carriage return it sends out. This would, in effect, remove one of the two line feeds you are getting.

Does anyone know of any WordStar printer drivers for the Daisy Wheel II?

And as far as CP/M + is concerned, many other manufacturers likewise restrict the operation of their version to support only the equipment that is standard with their hardware. Osborne, for example, originally supported only single-density, single-sided drives, and wouldn't read disks formatted in other computers. Double-density and double-sided support required that the Basic Disk Operating System (BDOS) be rewritten to take into account these newer disk drive capabilities. And as far as that goes, have you tried using 80-track drives in an IBM? Or how about being able to read AT&T or Tandy 2000 disks in an IBM computer (if the disks aren't formatted to "standard" PCDOS 1.0 or 2.0 specifications)?

It's all a matter of perspective, and I'm getting tired of people continually harping on Tandy's poor support when Tandy provides more than most other companies ever consider giving. For example, there's the bug in IBM ROM Basic that misprints calculations with .001 as .01 (Microsoft even admitted to this bug). IBM, when questioned, refused to acknowledge a problem and is still selling the buggy ROM. Tandy, meanwhile, has introduced new ROMs to replace bugs as they are documented.

Q: My computer is a Model 4 with 128K and two disk drives. My operations manual says that I can use MEMDISK for my system drive. When I try to designate it as such, I get an "Install System Disk" message. How do I install a system disk in MEMDISK? I only have about 57K of free space. *(Ron Widener, Central Valley, CA)*

A: First, install MEMDISK as a drive other than zero (for example, as drive 3). Then format it as double-density. Now copy the system utilities from drive zero to MEMDISK using the Backup command (and specify the SYS utilities with the wildcard specification parameter). Finally, use the System command to change MEMDISK to drive zero. According to my calculations you should be able to put all the system files into the MEMDISK area (Basic and all its overlays might not fit).

Q: I am looking for a copy of SUPER-DOS with documentation for the Model III. Does anyone know where I can get a copy or where Sandy Blair can be contacted?*(Marleen Palmer, Little Rock, AR)*

A: I can't find Sandy; can someone else help?

Q: I own a Model 4P, a Commodore 64 with 1541 drive, and a Pro-Writer printer. I have a fairly large library of Commodore programs, both commercial and self-written, mostly for engineering. Is it possible for me to transfer those programs from the 1541 to the 4P so that I would have minimal editing and not have to rewrite the entire program manually to the 4P? *(John M. McDougal, Saint Albans, WV)*

A: Only Basic or text files can be transported from the Commodore to the 4P, and only if the program is all Basic and doesn't use any sound or graphics routines.

The best way to ship files is to use the RS-232 ports of the two computers. Unfortunately, the Commodore uses a nonstandard voltage for its RS-232 lines, so you will have to buy the Commodore RS-232 card, the 1011A interface. Also needed is a null modem to properly connect the two computers together, as well as an RS-232 cable.

Once you have all the hardware, here's what you do: With both computers off, plug the Commodore 1011A cartridge into the Commodore user port. Next plug the null modem into the 1011A, the RS-232 cable into the null modem, and the cable into your Model 4P. Turn on the Commodore display, the Commodore computer, your Commodore drive, and the 4P. Now use the Radio Shack command SET *CL COM/DVR. Next use the SETCOM command to set the RS-232 parameters you want to use, and finally load the COMM program into memory. On the Commodore end you just need to open the RS-232 as your print device and then list your programs to it. Graphics characters in your Commodore program (such as heart, spade, or diamond) will cause you problems because the ASCII character set only uses 7-bit words while the Commodore graphic characters use all 256. The 1011A cartridge should take care of translating Commodore Basic's shorthand key words into ASCII characters, but the special characters for setting screen colors will have to be edited out of the programs before transferal.

The best parameters to start with are 300 baud, 8-bit words, no parity, and 1 stop bit. After you get the programs to your 4P, load them into a text editor and start searching for those Commodore commands that won't work in 4P Basic (such as Home and GET$). One book you'll find helpful is *BASIC Conversion Handbook* by David Brain, et al (Radio Shack Catalog # 62-2088, $5.95). The book is actually designed to assist you in translating Commodore PET programs to the TRS-80 cassette machines, but most of the commands are just as applicable to the Commodore 64 and 4P Basic. You might have to check several stores for the book as it is hard to find.

Q: I have written several letters to Tandy/Radio Shack with requests for information, for technical publications, and for parts. I have received a uniform response to all letters: nothing.

Right now I need to buy another keyboard for a Color Computer II that won't work. I want to buy the part, but know neither the part number nor price. I am unable to establish who to write to, who to send money to, or how much. Any suggestions? *(Jess Peeler, Costa Rica, Central America)*

A: For parts you have to write to Radio Shack National Parts Division, 900 E. Northside Drive, Fort Worth, TX 76102, but you can get it cheaper from Perry Computers (124 S. Main St., Perry, MI 48872) or Spectrum Projects (P. O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421).

If you must replace your keyboard,

why not replace it with a real one? Hard Drive Specialist (16208 Hickory Knoll, Houston, TX 77059) sells the Keytronics KB500 keyboard for $69, and HJL Products (955 Buffalo Road, P.O. Box 24954, Rochester, NY 14624) sells the HJL-57 for $79.95. Both are excellent products and kilometers ahead of the Radio Shack version. If the Color Computer is your primary machine, why not subscribe to *Hot CoCo*, our sister publication for that computer?

Q: Here are some tips that I have passed on to many people who have asked me how to force their Models 4 and 4P to do things in the Model III mode that many tell them is impossible.

Selecting clocks and speed: I have seen a couple of submissions to the Input section of *80 Micro* that show how to select the faster 4 MHz clock speed as opposed to the Model III mode's 2 MHz clock. The trick is the port mask at hexadecimal (hex) address X'4210' or decimal 16912. This mask writes to port X'EC' (decimal 236). The following six POKEs from Disk Basic will give you useful results. Notice that you should also OUT the value to the port, as in some cases the mode selection will not take hold until it does.

POKE 16912,40:OUT 236,40: This is the normal state with the Model III 2 MHz clock speed and the 64-character mode selected. You should use it prior to any disk file input/output, as otherwise the disk routines will also run at the faster 4 MHz clock speed. This might cause problems, such as overwriting a directory sector incorrectly or trashing the disk's directory completely, especially on large disk files with several directory extensions. Of course, once disk I/O is complete, you can reenable the 4 MHz clock rate.

POKE 16912,41:OUT 236,41: This selects the normal mode plus the clock display in the upper right corner of the screen.

POKE 16912,44:OUT 236,44: This selects double-wide characters–the 32-character mode. Note that a value of 45 selects this and the clock display mode, but since the clock display is shown in POKE format in the upper right corner, it is entirely unreadable.

POKE 16912,104:OUT 236,104: This selects the normal mode with the 4 MHz clock speed. You should notice the doubled speed of Basic and machine-language programs.

POKE 16912,105:OUT 236,105: This selects the normal mode with the 4 MHz clock speed and the clock display in the upper right corner. Since the clock is running twice as fast as ROM intends, your clock accuracy will be speeding toward the 21st century ahead of everyone else, but some programmers might have a use for this.

POKE 16912,108:OUT 236,108: This selects the double-wide 32-character mode with the 4 MHz clock speed.

Of course, if you already know the state of address X'4210', then things can be much simpler. You can select and deselect individual functions. To set a single bit in X'4210' for a particular function, leaving any others intact, you can enter Y = PEEK(16912) OR X:POKE 16912, Y:OUT 236,Y, where X is 1 for enabling the clock display, 4 for selecting the 32-character mode, and 64 for the 4 MHz clock rate. To reset a bit, you would enter Y = PEEK(16912) AND X:POKE 16912, Y:OUT 236,Y, where X is 254, to disable the clock display, 251 to set the 64-character mode, and 191 to select the 2 MHz clock rate.

Some programs that run on the III and the 4 in III mode will not run on the 4P. This is because of several changes in the 4P's ROM image. For example, on the Model III and Model 4, address X'43' contains a carriage return, which covers an unused vector. But the Model 4P contains other code: a jump command to address X'0434'. Again, X'0434' in the Models III and 4 sits in the middle of the printer driver. Not so in the 4P. However, those addresses released by Radio Shack still work, such as the Print Character call at address X'33'. The math routines work fine, as do most upper-ROM routines. A lot of what these changes concern themselves with is correction of minor problems, as well as the form-feed driver, making the need for the program LPC/CMD unnecessary.

A final note: Those who purchased the *Model 4 Technical Reference Manual* will find that Appendix C's page 381 represents codes zero through 31 incorrectly. The values shown are for the Model III. These codes are different, even in the Model III mode. Use instead the values shown on p. A-58 of the *Model 4/4P Disk System Owner's Manual*. I hope that you will find this information useful. *(David R.Goben, Story City, IA)*

A: Thanks for writing; your help is greatly appreciated.

Q: I use a Model III, DOSPLUS 3.4, a single Percom single-sided, double-density drive and an Aerocomp controller. I recently bought a used Olivetti double-density drive with "Test Drive" stamped on its back edge. The Olivetti works perfectly as drive zero in a single-drive system with DOSPLUS. It will not read TRSDOS disks. It works fine in a two-drive system only if it is drive 1.

This Olivetti has two modules at the rear of its logic board, each containing eight pins and a shorting bar. One of the modules selects the drive number. The other module only works when the shorting bar is across the second pair of pins. I would like to know what each pair of these pins is for.

On the Percom drive, I would like to know the purpose of each of its shunts or how to set it up.

Last, I would like to know where to get information (schematics and manuals or operating instructions) for the Olivetti, Percom, and Shugart drives. I hope this isn't asking too much! *(E.K. Freshwater, Haw River, NC)*

A: I believe you are right in diagnosing the problem as having the DIP shunts set to the wrong parameters. For manuals and such, write to Olivetti Corp. at 155 White Plains Road, Tarrytown, NY 10591, 914-631-8100; for Percom, I can't find any current address or phone number (anyone else?); and Shugart information is available from Shugart/Xerox, 475 Oakmead Parkway, Sunnyvale, CA 94086, 408-737-7900.

Sorry I can't help with the Percom data.

Q: In the February 1985 issue (p. 19), James Criscimagna wrote asking if anyone knew of a graphics screen dump program for his RX-80.

I have an FX-80 and Model III and have had the same frustration that he has encountered. As there is no address given, could you perhaps tell me if he received any mail on the subject, or send me his address so I can ask him myself? *(Kent Cronin, Port McNeill, BC, Canada)*

A: You and everyone else interested can see the responses to Jim's letter in the next column of Feedback Loop.

Q: Charles Donsi wrote in the November 1984 Feedback Loop (p. 16) that he had bought a Holmes VID-80 modification board for his Model III but can't get Scripsit to work.

I also bought a VID-80 board, and switched to LeScript, which uses the 80-character by 24-line screen. Since Mr. Donsi is already familiar with Scripsit, using LeScript would probably be very easy for him. LeScript also has some nice extra features like form letters and printer drivers for practically every printer ever made. (*Frank Stratton, Highwood, IL*)

A: Thanks for the information.■

Terry Kepner is a free-lance writer and programmer. He writes monthly columns for Portable 100 Magazine, Hot CoCo, Under Color, *and* 80 Micro. *He is the Technical Editor for* Pico Magazine, *and has been writing about microcomputers since 1979.*

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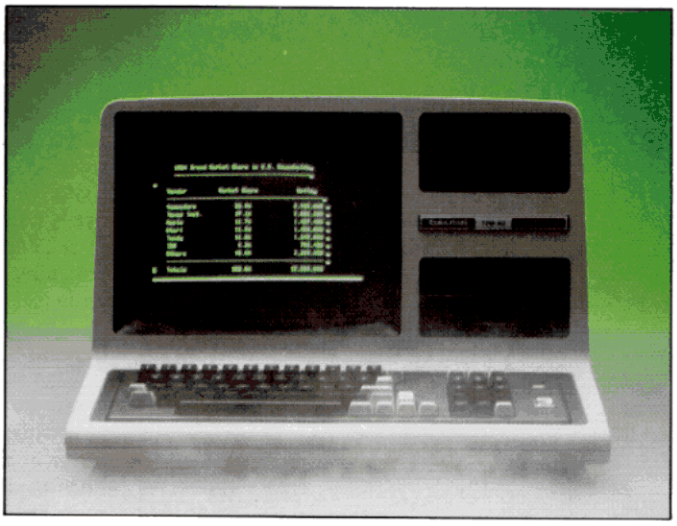
Model 4 Redux: Tandy Debuts the 4D

Tandyland



As this issue was going to print, I heard from sources at Radio Shack that a new version of the Model 4, the Model 4D, would be in their fall catalog as part number 26-1070 and retailing for $1,199. The "D" stands for "double-sided drives," thus doubling the 4's floppy disk storage. The new version also includes 128K RAM as standard, up from 64K on the older 4's.

Stewart Weinstock, Tandy's Model 4 and Model 100/200 buyer, said that the company had discussed enhancements but wouldn't specify when they'd be instituted. Weinstock contends that the Model 4 available through the fall is "the same Model 4 it's always been."

Discussions on CompuServe's special-interest groups about a new operating system, TRSDOS 6.2.1, supported the rumors. The new DOS adds a question in the disk formatting program asking how many heads/sides you want.

Bill Schroeder of Logical Systems Inc., which sells LDOS and manufactures TRSDOS 6, said he couldn't discuss products LSI might be doing for Tandy because of "strict nondisclosure agreements."

Weinstock did admit that TRSDOS 6.2.1 would be available during the summer, but not as a new version of the operating system. "6.2.1 is an effort to fix the 29 or so bugs we've found in the original operating system," he said. "If we were coming out with a new system for the Model 4 it would have to be TRSDOS 6.3."

Meanwhile, the July 1 issue of *InfoWorld* reported that Tandy will introduce an upgraded Tandy 1000 called the 1000A, which will include a socket for Intel's 8087 math coprocessor chip. The new machine, the article said, would become available in September 1985.

The new slot required some modification to the original 1000's motherboard to make room for the new chip. In addition to the machine's new mathematics capabilities, the redesign gives the 1000 a minus 5-millivolt signal, necessary for certain networking applications.

Tandy's buyer for all their MS-DOS machines, David Frager, wouldn't comment.

Also regarding the 1000—it is now being sold in Radio Shack's 5,000 non-computer stores in addition to its 1,100 Computer Centers.

Early in July, Tandy released preliminary sales figures for the month of June and for fiscal 1985. While June sales were up 6 percent over the same period a year ago, sales during all of fiscal 1985 rose only 2 percent above fiscal 1984. A full financial report was expected in mid-August.

In dollars, the June increase translated into a gain of $11.5 million over last June, as sales rose from $202.3 million to $213.8 million. The disappointing 2 percent rise from 1984 to 1985 underscores the difficulties Tandy faced during its last fiscal year. In fiscal 1984, the company saw sales increase 11 percent over fiscal 1983, but the microcomputer shake-out hit hardest over the last 12–14 months, causing a protracted sales slump.

Tandy/Radio Shack and the New York publishing house John Wiley & Sons are getting together to provide a new line of software for Tandy computer owners. Under an agreement signed last summer, Wiley's professional software division will supply instructional software through Tandy's Express Order Software service. Tandy will provide technical support for the software's development.

According to Peter Clifton of John Wiley's professional software division, you can expect programs on VisiCalc, stock selection, lighting analysis, and structural analysis. Clifton emphasized that while these programs were written for Tandy's MS-DOS machines, Wiley is also providing two Color Computer programs called Color Extravaganza and More Color.

Fall announcements from the Tandy Towers include some much-needed software for the Tandy 200. Stewart Weinstock said the products, scheduled for a September 1985 release, include a data base manager, a scheduling program beyond the SCHEDL program in ROM, a text manager, and bar code applications.

Weinstock said sales of the Tandy 200 were "moving well even considering the sluggish early response to the 40-character by 16-line screen." Before the 200 was introduced, some Tandy watchers expected an 80-column by 24-line screen and, possibly, disk storage. Consumer disappointment might have caused slow early sales.

As for the 200's predecessor, the Model 100, Weinstock says Tandy will sell it at bargain prices for as long as people want it. New software and peripherals continue to be introduced for the two-year-old laptop. It is still a valuable alternative to the bulkier Tandy 200 and other laptops with higher price tags.

MicroTrends

Since March of this year, Polaroid Corp. of Cambridge, MA, has offered a

Photograph by Frank Cordelle

Agency	Quantity	Cost (x$1,000)
Dept. of Defense	17,419	53,215
NASA	4,029	14,080
EPA	1,910	9,893
Dept. of Transportation	1,729	10,324
Dept. of Agriculture	1,501	5,914
Dept. of Interior	1,348	5,364
Gen. Services Admin.	1,066	3,988
Dept. of Commerce	924	3,698
Dept. of Energy	924	3,662
Dept. of Treasury	895	4,011
	31,745	114,069

Table 1. Top 10 federal agencies buying micros in 1984.

Vendor	Units Sold	Percent
IBM	10,090	27
Zenith	8,447	23
Digital Equipment Corp.	2,267	6
Convergent Technologies	1,946	5
Wang	1,735	4
Raytheon	1,576	4
Apple	1,213	3
Tandy	1,205	3
Compaq	1,019	2
Hewlett-Packard	839	1
Others	6,941	22

Table 2. Leading suppliers of micros to the government.

unique service to users of its floppy disks. If you contaminate the surface of a Polaroid floppy and lose the data, Polaroid will recover the information free of charge. All you have to do is call their toll-free number (1-800-241-4403) to get a special mailer for the disk and ship it to their data recovery center in Chicago. Within 48 hours of receiving the damaged disk, Polaroid will recover the data, transfer it to another Polaroid floppy, and mail the new disk back to you. The offer is good worldwide for the life of the disk, and is only available for Polaroid disks.

Sound too good to be true? Well, it did to me. Many floppy manufacturers will replace damaged disks, but the information is gone forever. Tom Milligan of Polaroid's Data Recovery Division says the company has recovered information from hundreds of disks since March. The service is generally used by people who have "lost accumulative data that cannot be quickly or inexpensively reconstructed."

The proprietary technology developed by Polaroid took 18 months to develop. When asked how much this service costs Polaroid, Milligan said, "A ton. At this point, considering the time and money it took to develop the technology, it costs thousands of dollars per recovered disk." So why does Polaroid do it? "We write it off as a cost of doing business," Milligan said. "Polaroid is a very customer service-oriented company."

Some of the contaminants seen by the recovery division are coffee, mustard, ketchup, White-Out, nail polish, Coke, and fingerprints. Virtually anything in the desktop environment can scramble data on a floppy but, according to Milligan, fingerprints are a major culprit: "Fingerprints are very, very destructive because of the oils and acids resident on the skin."

For each contaminant, the method of recovering the data varies. "We don't have a magic machine where you can put the contaminated disk in one end and get a good one with all your data out the other end," said Milligan.

According to Milligan, the program has been almost 100 percent successful. Since it's inception, Milligan could remember only one instance where Polaroid could not recover all the data on a disk. "*Compute* magazine sent us a disk that was contaminated, and while that was taken care of with no problem, they inadvertently put a staple through the disk jacket. The only data we lost was where the staple holes were located."

The June 7, 1985, edition of *Government Computer News* highlighted the huge increase in microcomputer purchases by the federal government during fiscal 1984: over 37,000 micros at a cost of $137 million, up from $34 million in fiscal 1983.

Where did all these new micros go? Not surprisingly, the Department of Defense was the biggest spender, buying 17,419 units for $53,215,000. In addition, the navy bought 10,649 machines and the air force 4,009. Other departments such as NASA (4,029), the Environmental Protection Agency (1,910), and the Department of Transportation (1,720) were the closest runners up (see Table 1).

Winning vendors were lead by IBM, which sold 10,090 units, including PCs and XTs. Zenith was second with 8,447 sales, mostly due to a large contract with the navy, while Digital Equipment was third with 2,267 units. Tandy/Radio Shack placed eighth in the hearts of federal purchasing agents, selling 1,205 units (see Table 2).

The survey was conducted by the General Services Administration (GSA).

Even as we approach the time of year when most home and business computer companies make or break their sales goals, InfoCorp is offering a bleak sales forecast for the rest of 1985. InfoCorp's Ralph Gilman told the *San Francisco Chronicle*, "We're in a slow growth period; we have been for a year and a half and we may be for another six months."

But InfoCorp analysts remain optimistic about 1986 and beyond. After flat sales in 1985, they expect sales to increase slightly in 1986, and they foresee large sales increases for the next four years.

Gilman had some other optimistic predictions about the microcomputer market:

- By 1990, 32 percent of US households will contain a personal computer. Ten percent of US households currently have a micro.
- Twenty-five percent of all wage earners will have a microcomputer at work by 1990, compared to only 8 percent at the end of 1984.
- Desktop micro sales will leap from 10.4 million units in 1985 to 28 million in 1990. This predicted increase represents a compound annual growth rate of 22 percent.

But you might want to take all this with a grain or two of salt. After all, last year InfoCorp predicted home computer sales would increase by 1 million units, when in fact the market slipped by 1 million units. At the same time, InfoCorp forecast sales of 10 million units in 1989; they've since revised the figure to about 5 million as a result of poor sales in late 1984 and 1985. ■

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Retrospectives

John D. Wolfskill has discovered that his **Helper program** ("Total Recall," July 1985, p. 54) **has a minor problem** running under TRSDOS 6.2. It seems that 6.2 stores the value of each keystroke 3 bytes higher than 6.1 does. You can correct the problem by first changing the second value in line 1460 from 249 to 252, and the first value in line 1510 from 24490 to 24493. You might also want to change the underline in the title routine so it won't hide 6.2's underline cursor. Change the statement in line 110 from RNI$ = STRING$(29,95) to STRING$(29,x), where "x" is the ASCII value of the new character. You might try 46, which will give you periods.

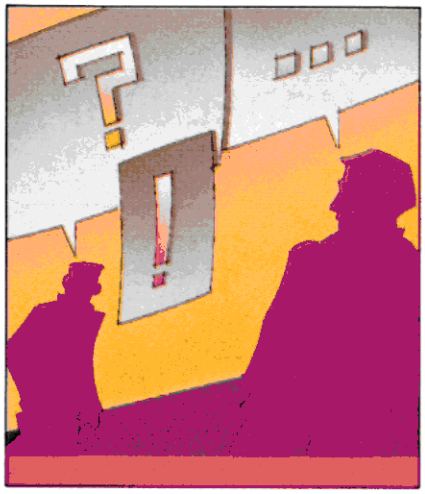
The **article "Don't Be Late"** (June 1985, p. 74) includes a reference to **a nonexistent Dimension statement** in the accompanying critical path scheduling program that has at least one reader confused. The sentence in question, in the third-to-last paragraph on p. 75, states ". . .you can add capacity for more tasks by modifying the dimension statement in line 120 for up to 100 tasks." Responds Robert Daniels of Knoxville, IL, "I don't understand that line. What am I supposed to do to it?"

Well, Robert, you can't do much to line 120 because it's just a Remark statement. The Dimension statement is actually in line 30, and you can change the capacity by replacing the 40s with 100s.

Without going into a lot of detail, the Dimension statement reserves memory for your data. The program as published allows you only 40 tasks because that's all the space the Dimension statement has given you. Increase the space for data to 100 and you're in business.

Model 4 owner T.E. Bennett of Mesa, AZ, wonders why he gets a **"type mismatch"** error in line 90 of our **hi-res fractals program** (May 1985, p. 58). That line starts out IFI$ = "Y" or I$ = "y" THEN C$ = "A". The solution is simple: Put a space between "IF" and "I$." Our Spinwriter apparently forgot that all Model 4 Basic key words must be delimited by spaces.

Bob Dobrowolski of Mepean, Ontario, is having trouble with the TRSDOS 1.3 **directory command in our Easydata program** ("Little Wonder," December



1984, p. 72). Line 380 asks you to input the drive number, assigned to variable D. The line, modified for TRSDOS according to the article, then goes on to read Q$ = "D " + STR$(D):CMD Q$. The problem is that CMD Q$ is executing as CMD"D d". Just insert a colon after the "D" assigned to Q$; the command will now execute properly as CMD"D:d". (See p. 97 of your Model III *Disk System Owner's Manual* for more details.)

Speaking of Easydata, Don O. Coffin of Los Alamos, NM, has a few **modifications for Model 4 users.** First, he recommends deleting the Clear statements in lines 10 and 60. Second, to print an abbreviated directory of /DTA files, change line 380 to

```
IF YC = 3 THEN CLS:SYSTEM "DIR /DTA
(A = N):PRINT:GOTO 220
```

Third, Coffin suggests using the Model 4's Erase command to redimension your arrays during run time so you can use the maximum number of records allowed. The program can thus handle any file from 1,800 single-field records to 90 records of 20 fields. "This means that Model 4 Easydata can handle virtually any home hobbyist's data base," he says. Just add the lines in Program Listing 1.

Get out your June 1984 issue. Jim Goodman of Mesquite, TX, has a way in which NEWDOS/80 users can **speed up the Model III sort routine** in "Proper Arrangements" (p. 96) by using NEWDOS/80's indirect sort. Delete lines 140 and 160–290. Change line 150 to CMD"O",N1,*IX(0),A(0,0). When sorting by address, change A(0,0) to A(0,1). "The contents of IX() will be in sorted order," says Goodman. "However, they will be offset by 100. . .[because of] the relative element number (REN) as mentioned in the NEWDOS/80 manual." Add line 160: FOR J = 0 TO N: IX(J) = IX(J) – 100:NEXT J. To sort by city, change A(0,0) in line 150 to A(0,2). The offset in line 160 would be 200.

Helpful Hints

Dexter Walker of Birmingham, AL, **doesn't like the Model III's PRINT@ statement**—"I have never been able to visualize where in the world sp[PRINT @817] would come out"—so he wrote a little one-line routine that makes the figuring easier. Put at the beginning of your program the statement DIM L(15):L(0) = 0:FOR J = 1 TO 15:L(J) = L(J-1) + 64: NEXT. This creates an array with the first video addresses of your 16 screen lines. Thus, L(0) = 0, L(1) = 64, L(2) = 128, and so forth. Now if you want some text to start, say, in the middle of line 13, you type the statement PRINT@L(13) + 32 (PRINT@864 the old way).

More on sorts: Gilman J. Stavens of Auburn, WA, supplies the Model III routine in Program Listing 2 to show how to use CMD"O" to handle numeric data.

In our December 1984 issue (p. 29), Bob Barringer asks whether there is a

Program Listing 1. Modification to Easydata.

```
574 IF NI>0 AND NI<20 THEN ERASE A$:DIM A$(NI,
1800\I):GOTO 580
576 CLS:PRINT "0 > N must be >21--try again!":GOTO 570
2044 IF NI>0 AND NI<21 THEN ERASE A$:DIM 7$(NI,
1800\I):GOTO 2050
2046 CLS: PRINT FL$;: PRINT " Not properly formatted for
Easydata--try again!"
2048 PRINT:CLOSE:GOTO 220
```

End

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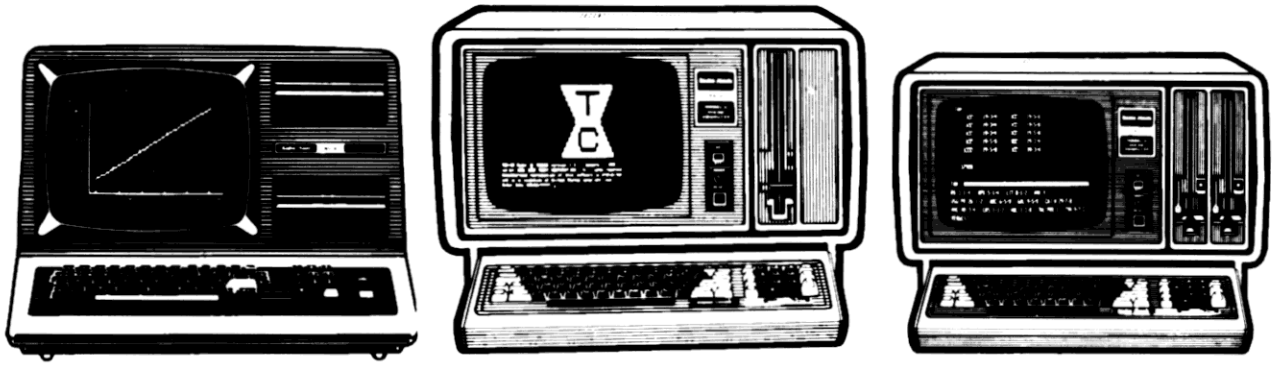

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Program Listing 2. Using CMD"O" with numeric data.

```
10 CLEAR 2500
20 DEFINT T,X
30 DIM NA$(120):T=120
40 FOR X=1 TO T:V=RND(1000)
50 NA$(X)=STRING$(6-LEN(STR$(V)),32)+STR$(V)
60 PRINT V,:NEXT X
70 CMD"O",T,NA$(1)
80 FOR X=1 TO T:PRINT NA$(X),:NEXT X
```

End

Program Listing 3. Reseeding the Model III's random number generator.

```
1 A$="aaaaaaaaaaaaaaaaaaaa"
2 A=PEEK(VARPTR(A$)+1)+256*PEEK(VARPTR(A$)+2)
3 FOR T=0 TO 19:READ X:POKE A+T,X:NEXT
4 DEFUSR=A
5 DATA 245,229,213,197,62,100,50,170,64,50,171,64,50,172,64,193,
209,225,241,201
15 INPUT R:POKE A+5,R
20 X=USR(0)
30 FOR T=1 TO 20:PRINT RND(20);:NEXT
40 GOTO 15
```

End

POKE address that he can access to **reseed the Model III's random number generator.** Well, sort of, responds Eric F. Wood of Delaware, Ontario. The seed is a 24-bit number stored in 3 bytes starting at 16554, and while you can't get at the seed from Basic, you can load it with the same starting value using the machine-language routine in Program Listing 3. Lines 1–5 POKE the routine into the string A$. Line 15 changes the initial byte, which is the sixth value in the data statement. If you run the program and input the same value each time, the same sequence of random numbers will result.

Michael Shrout described in our May column (p. 27) how to use a **Model 100 printer cable** and 34-pin card-edge connector in place of a Model 4P parallel printer cable. He has since received a number of letters from Model 4 people who are having trouble making the cable work.

"The Model 4 manual says to install the cable with the cable pointing toward the front," he writes. "As there are two possible ways to put the connector on the cable, about half of the people who have written apparently got it backwards." Shrout has some suggestions. First, make sure the blue-striped conductor is at position 1 on the connector. Second, make sure that all conductors are firmly connected to the card-edge connector. And third, make sure the card-edge connector is plugged into the computer so that pin 1 on the connector is attached to pin 1 on the circuit board edge.

Need Help

►Gary W. Shanafelt (2128-1/2 S. 18th St., Abilene, TX 97605) is looking for Model III tape versions of Galaxy Invasion Plus (Big Five) and Laser Defense (Med Systems).

►The Cambridge Center for Behavioral Studies (11 Ware St., Cambridge, MA

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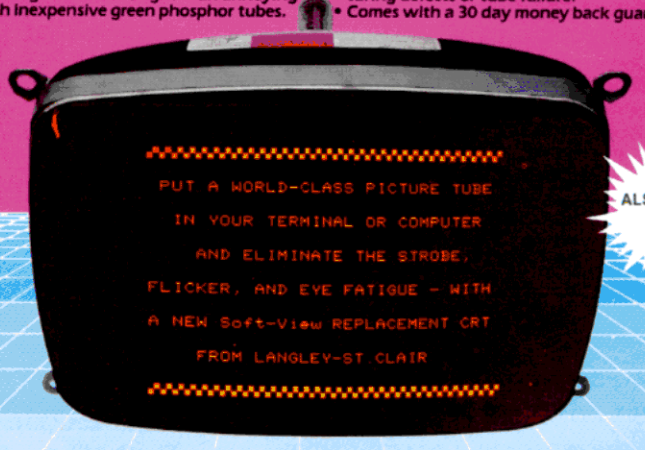

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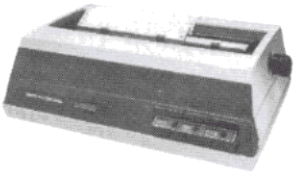

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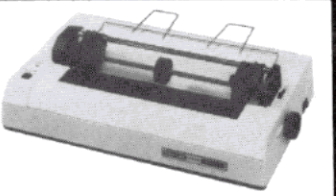

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02138) is a nonprofit organization looking for donations of TRS-80 equipment. You can call them collect at 617-495-9020.

►Christopher S. Lobban (University of New Brunswick, P.O. Box 5050, Saint John, N.B., Canada E2L 4L5) would like to hear from anyone who has modified the Model 4 Maillist program to produce alphabetized mailing lists.

►If you know of an AIDS-like program that runs under MS-DOS, Richard L. Rahn (P.O. Box 4580, 3340 Tully Road, Suite D-2, Modesto, CA 95352) would like to hear from you.

►Kenneth R. Johnson (146 16th Ave. S., South St. Paul, MN 55075) is looking for public-domain programs that will produce detailed pictures on an Epson with Graftrax.

►John Dauphiny (812 Mathes Hall, Bellingham, WA 98225) would like to know where he can get a new Model III case and a black keyboard cover.

►If you've got a screen dump routine that will work with the Graph Master program ("By the Numbers," February 1985, p. 68) and a Star Gemini 10 printer, write Daniel R. Campos, 11747 Mulhall St., El Monte, CA 91732.

►Stephen Jenks (1711 Sherman Ave., Canon City, CO 81212) would like help on two problems he's having with his LNW Team computer. First, he has a wavy 80-column screen when running CP/M and DOSPLUS IV, and asks whether the problem is a bad capacitor. If so, which one? Second, while under CP/M, the computer will often print letters randomly on the screen. Jenks is also interested in public-domain graphics programs for the LNW, and is looking for a RAM disk routine for CP/M.

►George Mercado (1251B Willow St., Myrtle Beach AFB, SC 29577) wants to read 1,500-baud Model III tapes with his Model I. Does anyone have a listing of the Model III read/write routines?

Miscellaneous

M.H. Briggs (#287279, 3-C-14 MSC-BMU, P.O. Box 520, Walla Walla, WA 99362) now owns a Model 4, and has a number of Model I tape programs that he no longer needs.

The National Xenix Users Group is looking for members. Write Martin Steiner, P.O. Box 34043, San Diego, CA 92103.

BBS Update

We've received a number of additions to our list of bulletin board systems ("BBS Directory," July 1985, p. 41), but due to space constraints cannot print them all. Here is a partial list; we'll publish more in future issues as space permits.

Also, please note that 206-226-5711 is not a BBS number.

Arena, The	201-487-8261
Backroom, The	212-849-6699
Backroom II, The	201-431-1216
CBBS HMS	415-845-2079
CBBS Lambda	415-759-8122
Christopher St.	201-992-5660
Club, The	516-589-6175
Cosbase III (Panama)	69-2212
Distant Dragon	405-728-8322
Dormitory, The	201-923-9521
Exclusive-80	215-739-9512
Fountains of Pleasure	313-996-5531
Inferno, The	609-886-6818
Infocomm OKC	405-942-1375
Joystick	213-790-2114
Micro Message Service	919-779-6674
M-Net (The Gay Conference)	313-994-6333
Oracle, The	818-509-0897
Park, The	718-526-8184
Ruppel-Set	606-291-9255
SBBS--STUDS 30	313-284-3614
Temple	405-634-4638
Third Floor BBS	215-435-6811
Tower Machine, The	213-467-5997
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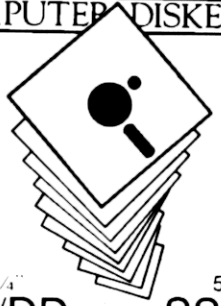

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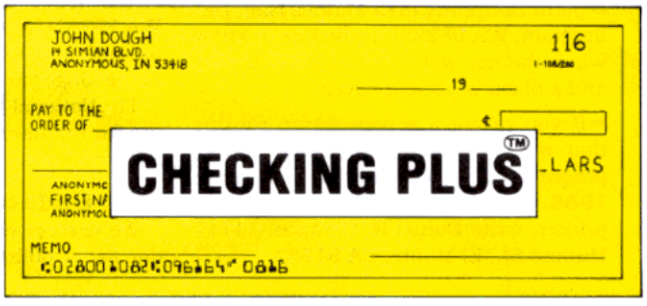

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Chart Your Business's Course With the Graphics Analysis Pak

by David Engelhardt

★★★★

The Business Graphics Analysis Pak runs on the Model III (48K) and requires two disk drives. Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102. Catalog number 26-1597. $174.95.

Easy to use: ★★★☆☆
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Many businesses need different charts to present their data properly. Radio Shack's Business Graphics Analysis Pak (BGAP) creates four types of graph (line, bar, pie, and scatter) easily and painlessly. It not only supports both low- and high-resolution graphics and printing, it can even print color charts (see Fig. 1).

You generate line charts with up to three curves; bar charts with single or stacked bars, or clusters of two or three bars; pie charts with up to 12 slices; and scatter charts (X-Y plots) for up to 100 pairs of data values.

To differentiate plotted data, BGAP lets you use different kinds of lines (solid, dash, or dotted) for curves and up to six types of shading for bar and pie charts. You can also type in your own graph labels for plot points or bars.

BGAP accepts data from the keyboard, a VisiCalc DIF file, a formatted Scripsit file, or a Basic or Fortran data file in proper format. You can insert, change, and delete data and perform arithmetic functions on it. Linear, quadratic, and exponential curves can be done along with different types of growth projections.

Start-Up

The Business Graphics Analysis Pak comes with four graph disks and three setup disks. The setup disks contain configuration programs for low-resolution printers, high-resolution (hi-res) printers used with both high- and low-resolution screens, and all Radio Shack color plotter/printers.

Radio Shack supplies the BGAP disks set up for their DMP-400 printer. If you have a different Radio Shack printer, you need to use the appropriate setup disk to reconfigure each of the graph disks.

If you have multiple computers (with and without hi-res boards) and different printers, you'll probably want to make different copies for each machine and printer.

Using BGAP

BGAP's menu-driven format makes it easy to use. Each graph disk displays a main menu, from which you elect to go to a data-handling menu, chart menu, or chart text editor menu (see Fig. 2).

In each of the menus, the default selection always flashes. As you press the up- and down-arrow keys to move through the menu options, the current choice flashes. In addition, BGAP displays a definition of the current choice along the bottom of the screen. You select an option by hitting the enter key when the one you want is blinking, or by hitting the appropriate number key.

When you display a chart on a low-resolution screen, only a portion of it may be visible. You use the arrow keys to move the chart window around on the display. If the graph you're creating is smaller than 11 by 11 inches, BGAP marks the top and right-page boundaries by dash lines for orientation.

If you have the hi-res board, BGAP displays all charts in their entirety. It doesn't, however, display any text associated with the graph, like that for labels or graph titles. Instead, BGAP indicates text with a reverse-video line of graphics characters. When you move the cursor to one of these lines and press the enter key, BGAP displays the missing text on the bottom of the screen.

The Data-Handling Menu

The data-handling menu lets you manipulate numbers. You enter data from the keyboard, retrieve it from a file, generate a sequence by specifying a starting value and increment, and edit, transform, display, print, and save data (see Fig. 3).

BGAP displays only 10 data values on the screen at once, with the total number of values currently in memory displayed at the top of the screen. You use the arrow keys to scroll through the data.

You change, insert, or delete data from the edit mode. You can view the data at any time to insure you're performing the proper action. Once you've edited the data, you can elect to save the corrections or disregard all changes.

BGAP also lets you look at trends the data indicates. BGAP supports three different trend types: linear, quadratic, and exponential. Trending may be performed in any time scale, such as days to months, or months to years. You can also show trending transposed on the same graph with the original data for a better picture of the subject.

Other features for manipulating data include growth, moving average, consolidation, and logarithmic. Growth projections plot future business growth in arithmetic or geometric growth rates. Moving average smooths the overall ef-

Illustration by Katherine Mahoney

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fect of fluctuations in data when showing an overall trend.

Consolidation compresses data by breaking it into consecutive sets and then summing each set. This is typically used to consolidate monthly data into quarterly data, and then into annual data.

The Logarithmic option calculates the common logarithm (base 10) of each data value. This may be used to convert exponential data growth to straight-line growth. You may also convert the logarithmic base 10 to a natural logarithm (base e) by multiplying each data value by a 2.30259 constant.

The Chart Menu

You use the chart menu to format your charts, including specifying the data you want to use and any of the graph's features (like dotted lines or shaded bars). You also scale the graph as necessary and provide any necessary text.

Each chart has its own shading characteristics. You can choose features from no fill to dark fill for designated areas. The fill style depends on the type of displayed chart and each style is dependent upon the printer being used. BGAP also supports horizontal and vertical fill lines.

Chart scaling scales data values down to a range suitable for display on a single graph. You can divide the data values by a specific factor (10, 100, and so on) before using them to create a chart, for example. In addition, you can add, subtract, multiply, and divide by any conversion constant to make data presentable. You can also project growth using your current data as a base, and otherwise manipulate your data to display desired and/or future results.

The Chart Text Editor

You can create titles, labels, and notes to enhance the charts. You can specify up to three titles for the top of the graph, bottom, or left vertical. You can also include vertical and horizontal axis labels.

Printing and Saving

Once you create a chart, you can save the chart to disk for later use. You can also save special print and load settings, useful since they require quite a bit of time to set up each time you display or print.

The hi-res graphics board is optional, since BGAP supports both high- and low-resolution graphics. The printed result is the same whether or not you use a high-resolution (hi-res) board. BGAP fully supports Radio Shack printers and plotters, including color devices. Check for compatibility if you have a different printer.

Conclusion

I found the manual free of errors, helpful, and well structured. While it's complex to create different chart styles, the manual takes you one step at a time, explaining each function in detail. Several sample graphing sessions help introduce you to the system. A section on using charts proves helpful; it covers selecting and scaling a chart and using text and shading to complement a chart.

Once you become familiar with the command options, you'll be able to easily set up and create charts. If your business demands the ability to create charts, BGAP will certainly do the job. ■

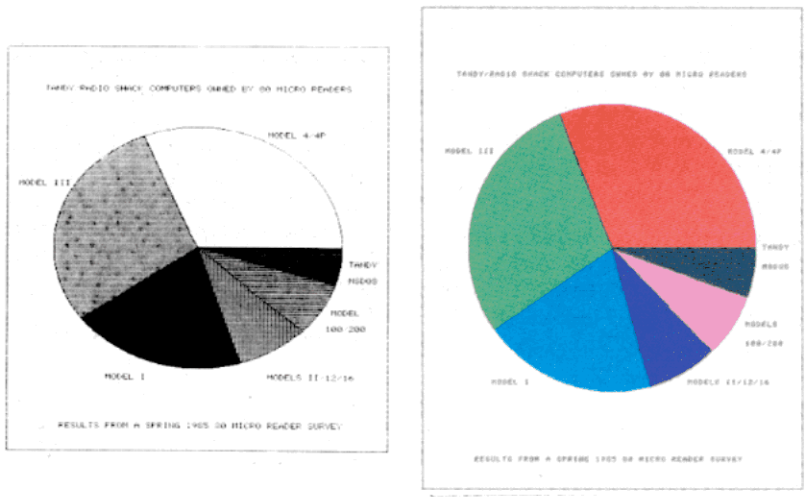

Figure 1. Sample BGAP printouts showing Tandy ownership among 80 Micro readers.

```
. . . . . MAIN MENU . . . . . .

1 DATA HANDLING MENU
2 LINE CHART MENU
3 CHART TEXT EDITOR MENU
4 STOP

. . . . . .

CREATES, EDITS AND TRANSFORMS
DATA.
```

Figure 2. BGAP's main menu.

```
. . . . DATA HANDLING MENU . . . .

1 ENTER DATA FROM KEYBOARD
2 ENTER DATA FROM FILE:
3 GENERATE A SEQUENCE OF DATA

4 EDIT DATA
5 TRANSFORM DATA

6 DISPLAY DATA
7 PRINT DATA
8 SAVE DATA:

9 RETURN TO MAIN MENU

. . . . . .

ALLOWS KEYBOARD ENTRY OF NEW
DATA.
```

Figure 3. BGAP's data-handling menu.

Windows on the TRS-80 World

by Edward Spitzbarth III

★ ★ ★

Windowpad runs on the Models I (16K) and III (32K) and requires either a cassette player or one disk drive. En Fleur Corp., 2494 Sun Valley Circle, Silver Spring, MD 20906. $21.25.

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Intercalc runs on the Models I and III (16K) and requires one disk drive. Comtrol Data Systems, P.O. Box 151, Asbury Park, NJ 07712, 201-774-0437. $29.95.

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Does the job: ★ ★ ☆ ☆ ☆

★ ★ ★ ½

Interprinter runs on the Models I and III (16K) and requires one disk drive. Comtrol Data Systems, P.O. Box 151, Asbury Park, NJ 07712, 201-774-0437. $29.95.

Ease of use: ★ ★ ★ ☆ ☆
Good docs: ★ ★ ★ ☆ ☆
Bug free: ★ ★ ★ ★ ☆
Does the job: ★ ★ ★ ★ ☆

As windows programs continue to grow in popularity, the TRS-80 computers are starting to get their share of them. Windowpad, Intercalc, and Interprinter are memory-resident window utilities you can call from other programs whenever you want. While these particular programs do have some uses, overall I found them limited in what they can do.

Windowpad

Windowpad acts like an electronic notepad, where you store small notes on any one of Windowpad's six "pages." Windowpad loads into high memory, tucked out of the way until you press the shift/down-arrow/N keys.

This brings the main menu to the top left-hand portion of the screen. You can edit or write a note from this menu, or list the next menu. You have to limit notes to 23 characters per line of only three lines each.

You type in a note's lines at the bottom of the screen, and Windowpad transfers them to the note after the 23rd character. It pops you back to the menu at the end of the third line.

The second, more interactive, menu lets you manipulate notes as you page right or left through them. Paging right makes the notes partially overlap one another as they move diagonally down the screen. If you page left, Windowpad peels off the notes one at a time, revealing the note underneath. This menu also offers an escape feature, which makes the notes and menus disappear, bringing you back to TRSDOS.

While I found Windowpad fun to use, it's easier just to use paper and pencil.

One other Windowpad feature is the timed reminder. After you write a note, Windowpad asks if you want to be reminded. If you enter a time, the note pops up on the screen at that time, using the computer's real-time clock.

One problem is that it is easy to overwrite any existing notes. Windowpad numbers notes from one to six and, at the main menu, asks you what number note you want to write. It doesn't check to see if that note already exists—it deletes it anyway. Also, you can't save notes to disk for later recall.

While I found Windowpad fun to use, it really is easier just to use paper and pencil. The author says that he uses Windowpad to keep track of memory addresses while writing applications programs. I found that if I wrote in high memory (where Windowpad resides), it will protect itself, causing strange reactions. Also, using Windowpad was a hit-or-miss proposition, since it works with some programs and not with others. And, of course, if you lock up your computer or happen to hit the reset button, you will lose all your notes.

Intercalc

Intercalc is a memory-resident calculator that remains invisible until you press the shift/down-arrow/C keys. This clears the screen and brings up Intercalc, which contains four graphics boxes, one for the running result and first entry, one for the other numeric entries, one for the last entry, and one for the memory function. You put the numbers you want to manipulate in different boxes to perform your calculations.

This can make complicated calculations a bit cumbersome. If you want to multiply four by five when you have a number in the results box, you first have to press the S key for the special menu, press the 2 key to clear the entry in the results box, enter "+5" there, and finally enter "*4."

Intercalc offers three other functions: a continuous or repeat function, a memory function, and a recall memory function. You can use these in combination with each other, making the system a bit more flexible.

One problem with the program is that you can't quickly enter numbers as you would with an adding machine or calculator. The keyboard can't read the numbers fast enough and sometimes loses them. I found this aggravating.

Interprinter

Interprinter was the only window program of the three that I personally could find a use for. It loads much like Intercalc, except that you pull it down with a different set of keystrokes. It lets you set your printer for different fonts, such as condensed, emphasized, double-width, and double-strike.

You also dictate line spacing, line and form feeds, and page length. You can enter one-line messages to print out things like titles of program listings, too.

Interprinter was easy to use and I found that it worked well. While it won't work with Scripsit, it does work with LeScript. Also, you can use Interprinter with Intercalc, and have them both resident at the same time. Depending on your DOS, and the way you install the two programs, you can call one program from the other.■

The Star Ratings

80 Micro's star ratings reflect our reviewer's impression of a product.

In most cases, the overall rating is an average of the ratings in each of the four specific categories. However, some overall ratings may be higher or lower than this average, depending on the reviewer's subjective opinion.

The stars mean:

★ ★ ★ ★ ★ Superior;
★ ★ ★ ★ Excellent;
★ ★ ★ Good;
★ ★ Fair;
★ Poor.

The ratings terms translate as follows:

Easy to use: How easy is it for the new user to use the hardware/software/book?

Good docs: Is the documentation clear and helpful in explaining the product's use and anticipating user problems?

Bug free: Did the reviewer encounter any bugs while using the product?

Does the job: How well does the product do what it was designed for?

Lean on Backrest for Hard Disk Back-Ups

by George Antunes

★★★★★

Backrest runs on the Models I, III (48K), and 4 (64K) and requires one disk drive and a hard drive. Powersoft Products, 17060 Dallas Parkway, Suite 114, Dallas, TX 75248, 214-733-4475. $99.95.

Easy to use: ★★★★★
Good docs: ★★★★★
Bugs: ★★★★★
Does the job: ★★★★★

While hard disk drives significantly increase disk storage capacity and reduce access time, they also can be difficult to live with. Backing up frequently updated files is time-consuming and tedious, and backing up files larger than a single floppy disk can hold is especially vexing since ordinary back-up utilities can't handle the chore.

That's where hard disk back-up utilities, like Backrest, come in. Backrest copies the contents of an entire hard drive partition to a floppy disk or restores a partition from the floppy. You can also restore selected files from a Backrest archive. Backrest performs well and works fast, and it couldn't be easier to use.

Using Backrest

Backrest comes ready to install under either LDOS (for the Models I and III) or TRSDOS 6.X (for the Model 4). Once you boot your system, you put the Backrest disk in drive 1 and type in INSTALL. After you answer the destination disk prompt, Backrest determines which operating system you're using and transfers the appropriate copy of the software to the target disk.

Backrest works with all flavors of 5-¼ inch disks (40- or 80-track, single- or double-sided) and with single- and double-sided 8-inch disks.

When you start the program, it asks whether you want to back up or restore files. If you choose the back-up option, Backrest prompts you for a source drive. It examines the source and calculates the number of floppy disks you'll need to handle everything. While you can specify files you want restored, backing up is an all or nothing-at-all proposition.

Backrest accepts any type of disks for back-up, as long as you have them in the same format, without locked-out sectors or tracks. Once you prepare the necessary number of disks, you must number them sequentially.

You can restore a partition previously copied to floppies in any order, but if you elect to restore a single file from a partition, Backrest prompts you for specific disks in their proper order.

The Tests

I tested Backrest on a Model 4 equipped with double-sided 40-track drives and a 10-megabyte hard drive. For comparison, I also ran benchmark tests on three other hard drive back-up utilities: an interpreted Basic utility distributed by Radio Shack, a utility distributed by Micro-Systems Software with the DOSPLUS IV hard disk drivers, and a utility distributed with the DOSPLUS 3.5 hard disk drivers. I also tested the standard File Copy routines included with Model 4 TRSDOS, DOSPLUS IV, and DOSPLUS 3.5. I did the benchmarks for DOSPLUS 3.5 and related utilities on an LNW II running at 4 megahertz (MHz). I made all the other tests on a Model 4 running at 4 MHz. The results appear in Fig. 1.

The clear loser was the Radio Shack hard drive utility. It took almost 18 minutes to make a verified copy of a 344K file, compared with six and a half minutes for the TRSDOS 6.0 Copy function. For verified copying of large files, Backrest was the winner; it cut the back-up time on the 344K file to about three and one-half minutes. Verified copies of the 688K benchmark file took 37 minutes with the Radio Shack utility, 11 minutes with the DOSPLUS IV RCOPY utility, and just under seven minutes with Backrest.

For unverified copies of that same file, the results are different. The Radio Shack utility turned in a dismal 25-minute time, compared with just under four minutes for Backrest. However, DOSPLUS's RCOPY was fastest at just over two minutes.

	File size	
	343.5K	**68K**
Model 4 (64K, 4MHz)	minutes:seconds	minutes:seconds
Backrest		
No verify	1:59	3:50
Verify on	3:36	6:52
Radio Shack HD utility		
No Verify	12:18	25:36
Verify on	17:57	37:08
DOSPLUS IV RCOPY		
No verify	0:56	2:06
Verify on	5:37	11:03
TRSDOS 6.0 Copy		
No verify	1:54	*
Verify on	6:32	*
DOSPLUS IV Copy		
No verify	1:12	*
Verify on	5:45	*
LNW-II (48K, 4MHz)		
DOSPLUS 3.5 Copy		
No Verify	2:08	*
Verify on	3:09	*
DOSPLUS 3.5 HCOPY		
No Verify	2:07	5:03
Verify on	6:44	13:32

Times are for copying only, and do not include time spent swapping disks for large files.

*File exceeds capacity of DS/DD 40-track drives on the benchmarking systems; DOS COPY function could not be used.

Figure 1. Benchmark timing tests for copying from a hard drive to disks.

Conclusions

Whether you need a hard drive back-up utility depends on the way you use your hard drive. If it contains files small enough to fit on a single disk that you rarely modify or change, you may be able to get by without such a utility. For all others, Backrest is strongly recommended as insurance against possible digital disaster.

Both Backrest and RCOPY perform well. If you use DOSPLUS IV, the RCOPY utility comes with the hard disk drivers. If you run LDOS, TRSDOS 6.0/6.2, or DOSPLUS 3.5, you should strongly consider making Backrest part of your system. It could save you a lot of grief when a file becomes glitched or you have a serious system crash.■

Concurrent Events With DoubleDuty

by Gary A. Ludwick

★★★½

DoubleDuty runs on the Model 4/4P (128K) and requires one disk drive. Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102. Radio Shack catalog number 26-2231. $69.95.

Easy to use: ★★★☆☆
Good docs: ★★★★☆
Bug free: ★★★★★
Does the job: ★★★☆☆

DoubleDuty is a unique memory-partitioning program from Radio Shack that lets you switch back and forth between two programs simultaneously active on a 128K Model 4/4P. Not only can you access both programs, you can also invoke certain DOS commands regardless of the programs in memory. While I found DoubleDuty useful for certain applications, I saw its inability to transfer information between the two programs as limiting.

Starting Up

Implementing DoubleDuty couldn't be much easier. You boot up with TRSDOS, insert the DoubleDuty disk, and type in DDUTY. Once the DoubleDuty Ready prompt comes up, the system reverts to TRSDOS Ready and you can load your programs.

At this point, DoubleDuty has divided the 128K RAM into two 64K banks, and the system is ready for the program for partition 1. Say this is Scripsit. You put the program disk in drive zero and load as usual. Scripsit displays its standard start-up screen.

To load the second program, press the Caps and F2 keys simultaneously to switch to the second 64K bank. Again, put in your program disk (in either drive zero or drive 1) and boot normally. That's all there is to it.

Now, the Caps and F1 keys take you to the first program partition, and the Caps and F2 keys to the second partition; Caps and F3 move you to the TRSDOS library commands section.

DoubleDuty Dos and Don'ts

While loading and moving around from program to program is pretty simple, you have to follow some strict protocol as you work. For instance, the version of TRSDOS that you use should remain consistent. If you boot up with version 6.1, you shouldn't switch to version 6.2 on another program.

One problem with DoubleDuty is the way it uses drives. For example, if you need your program disk always accessible in drive zero and you need a data disk in drive 1, then you'd use both drives with the program in partition 1. If you then use a two-drive program in partition 2, you have to remove the partition-1 disks and replace them with those for the second program. This can get to be a real hassle when you're trying to use two programs together.

One solution is to put both large programs on one system disk for drive-zero use, and only switch data disks in drive 1 as you move from partition to partition.

You have to work with DoubleDuty just as if you were running only one program. Another way to look at it is that, yes, you have two programs under simultaneous control, but you only have two disk drives to use for both programs. This diminishes much of the product's glitter.

DoubleDuty's Limitations

The Radio Shack catalog makes a big deal out of having a word processor and a spreadsheet in your computer, and being able to retrieve information from one for use in the other. But you'd better have a pencil and paper ready, because DoubleDuty doesn't let you move information directly from one partition to another.

The information is accessible, but you have to write it down, switch back to your other program, and type it in from your notes. A cut-and-paste function (such as the one in SuperLog 4) would significantly improve this program.

However, I queried Model 4 users on CompuServe about their uses for DoubleDuty. One use mentioned time after time was DoubleDuty's help with programming. Many owners install source code in one partition and the assembled code in the other. They run the program and when errors occur, switch back to the source code and make corrections without constantly loading and reloading.

Some edit in one partition and assemble in the other, or have TRSDOS in one and Basic in the other. One user had complementary programs in adjacent partitions (PFS:File and Report). All of these uses make great sense and help to save time.

Conclusion

DoubleDuty is a neat idea that just doesn't quite live up to its promise. Once the novelty of having two programs in memory at the same time wore off, I found its applications limited by the lack of direct information interchange between the partitions. However, others have found valuable uses for such a program.■

Pawn Brokers: Two TRS-80 Chess Games

by David Engelhardt

★★★★★

Tournament Chess runs on the Models I, III (48K), and 4/4P (64K) and requires one disk drive. It supports the high-resolution board by Radio Shack and Micro-Labs. Rapidynamic Software Inc., 14358 Dyer St., Sylmar, CA 91342. $49.95.

Easy to use: ★★★★★
Good docs: ★★★★★
Bug free: ★★★★★
Does the job: ★★★★★

★★★★

Chess Classics runs on the Models I and III (48K) and requires one disk drive. Noteworthy Software Inc., 12 Noteworthy Drive, Danbury, CT 06810. King Pawn disk $59.95, Queen Pawn disk $59.95; both for $100.

Easy to use: ★★★★☆
Good docs: ★★★☆☆
Bug free: ★★★★★
Does the job: ★★★★★

If you're tired of games that require only reflex action, try your hand at chess. Of all games of mental concentration, chess is at the top.

Tournament Chess and Chess Classics offer computerized versions of this classic pastime. Tournament Chess pits you against the computer, while Chess Classics teaches you game strategy with 64 of the best games from international competition.

Tournament Chess

Tournament Chess is the best chess game I've ever played. Rapidynamic advertises this program as capable of beating any other TRS-80 chess game on the market and I'm inclined to believe them.

Tournament Chess has an opening book of over 2,000 moves and its knowledge base is so extensive it can play all opening styles, middlegame attacks, and endgame strategies. It supports 10 skill levels.

Before play begins, you set options for playing level, board positions, cursor speed, chess pieces, and board orientation.

You then choose among four possible game opening styles: open, close, half-open, and modern. Each option triggers a specific strategy on the computer.

You move the chess pieces by positioning the game cursor with the arrow keys over the desired piece, hooking it with the spacebar, moving it to the desired lo-

Continued on p. 110

TRS-80™ MODEL 1, 3, AND 4 SOFTWARE

Circle 175 on Reader Service card.

TYPITALL Word Processor $129.95
TYPITALL with Spelling Checker $179.95

Word Processor upwardly compatible with SCRIPSIT — it reads your old SCRIPSIT files and uses the formatting and cursor movement commands you are already familiar with. But it is a completely new word processor with so many advanced features that we can't even mention all of them here.

Send **any** control or graphic/special character to the printer. Control/graphic characters included **in the text** so that you have complete control of all features of your printer. Print the formatted text **on the screen** before going to the printer. Send formatted text to a **disk file** for later printing. **Merge** data from a file during printing. Names, addresses, and other text can be inserted during printing. No need for a separate program for "mail merge" capabilities. Print while editing (spooling). Assign **any sequence of keystrokes** to a **single** control key. Call up to 16 **help screens** at any time. **Move cursor** forwards or backwards by character, word, line, or page. **Reenter** the program with **all text intact** if you accidentally exit without saving the text. Optional spelling checker comes with 29,500 word dictionary. Verify a 3,500 word document in **less than two minutes.** True Model 4 (80 x 24 display, TRSDOS 6) and Model I/III versions.

SYSTEM DIAGNOSTIC $99.95

Is your computer working correctly? **Are you sure?** System Diagnostic has complete tests for every component of your TRS-80 Model 1, 3, or 4 (separate versions necessary for each model).

ROM: checksum test. **RAM:** three tests including every location and data value. **Video display:** character generator, video RAM, video signal. **Keyboard:** every key contact tested. **Line printer:** character tests with adjustable platen length. **Cassette recorder:** read, write, verify data. **Disk drives:** disk controller, drive select, track seek, read sectors, formatting, read/write/verify data with or without erasing, disk drive timer, disk head cleaner. Single or double density, 1-99 tracks. **RS-232-C interface:** connector fault, data transmission, framing, data loop, baud rate generator.

SMART TERMINAL $74.95

The **intelligent** telecommunications program for your TRS-80 Model 1, 3, or 4, or Model 2 CP/M. **Memory buffer** for sending and receiving files. **Automatic transmission** of outgoing data. **Automatic storage** of incoming data. **Character translations.** True BREAK key. Help screens, line feed filters, echo and line printer toggle switches, and more.

TRS-80™ MODEL III ASSEMBLY LANGUAGE $16.95

A complete course in assembly language, written for the **beginner.** Contents include: The Z-80 instruction set; TRS-80™ Model III ROM and RAM; using the Editor/Assembler; reading, printing, and moving data; arithmetic operations with integers; floating-point and BCD numbers; logical and bit operations; cassette input and output; USR subroutines in BASIC; RS-232-C data communications; disk input and output; the TRSDOS 1.3 disk operating system.

MONITOR #5 $22.95
Book and MONITOR #5 $29.95

A comprehensive machine language monitor and debugging program. **Display** memory in ASCII or heaxdecimal format. **Disassemble** memory to show machine language commands. **Move and compare** blocks. **Search** and **modify** memory. **Relocate** machine language programs. Read and write **cassette tapes. Unload** programs in low RAM on disk. **Print** optionally on video display or line printer. **Save and load** disk files. **Input and output of disk sectors,** bypassing disk operating system. **Complete debugging package,** including setting and displaying registers, single stepping through machine instructions, setting breakpoints, and executing machine language operations.

TRS-80™ – TANDY – MS-DOS IBM – CP/M SOFTWARE

SMALL BUSINESS ACCOUNTING $99.95

Newly revised, this program is based on the **Dome Bookkeeping Record #612,** and handles **general ledger** and **payroll** for a small business. Category breakdowns are provided for both income and expenses. Monthly, through last month, and year-to-date summaries computed. Start the fiscal year with any month.

Payroll section handles up to 99 employees. Automatic computations for F.I.C.A., federal and state income tax. Three optional deductions also included. Print both payroll and expense checks using same forms. Reports include monthly, quarterly, and year-to-date summaries, 941 and W-2 forms. Simple and easy to learn — ideal for first-time computer users.

HOME BUDGET and CHECKBOOK ANALYST $59.95

A complete checkbook program together with budgeting, income and expense analysis, comparisons, and projections. Enter and print checks, enter deposits, and compute your current checking balance. Program also handles non-check expenses, bank debits, and income. Monthly and year-to-date summaries and yearly projections based on data through a known month. Monthly expenses compared to a pre-established budget.

MAILING LIST $69.95

Build and maintain mailing lists of up to as many names as you can fit on standard diskettes (1,250 for TRSDOS and CP/M, 2,500 for MS-DOS). Four-line labels with optional line that can be used either for unprinted data or as part of the label. Add, change, delete, or find names. Sort according to data in **any** field. Print labels in 1, 2, 3, or 4 adjustable columns.

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A complete **point-of-sale** program for a small business. Handles **order entry, invoicing, inventory,** and **bookkeeping,** including general ledger, accounts receivable, and accounts payable. Includes up to 999 8-character part numbers. Items deducted from inventory when orders entered. Handles both customer accounts and single orders. Invoices printed on forms or plain paper and include discounts, sales taxes, and shipping and handling charges. General ledger produces monthly and year-to-date totals. Receivables tracked to invoices, automatically updated as income entered. Inventory reports track sales by part numbers.

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*TRS-80 is a trademark of Tandy Corp.

Circle 411 on Reader Service card.

MONTEZUMA MICRO

WOW! ANOTHER NEW PRODUCT FROM MONTE

PRESENTS

MONTE'S TOOLKIT $49

REQUIRES: Montezuma Micro CP/M® 2.2 version 2.21+

Monte's Toolkit is a collection of utilities that will prove useful to every owner of Montezuma Micro CP/M (you all are owners, aren't you?). It's a disk full of programs that perform functions that are difficult, cumbersome or expensive to do any other way. Monte has tried, in his own way, to briefly explain each function for you below. Read on and be saved.

DOUBLECROSS® allows unlimited file transfers between CP/M®, IBM-DOS and Model 3/4 LDOS® /TRSDOS® with unsurpassed ease and speed. In fact, you can move just about anything from any disk to any other disk but you might have to make changes for program operation. Lotus 123® just flat won't run on your Model 3 and I doubt that you could ever modify Scripsit® enough to run on the IBM. Simple menus guide you through the operation with minimal keystrokes. Just tag the files you want in the directory display and go. You won't get doublecrossed with **DBLCROSS.**

FREEFORM® formats and backs up Model 3/4 LDOS/TRSDOS and IBM MS & PC- DOS (versions 1.x, 2.x and 3.x), both single side and double side plus there is a special "clone" copy when you just don't know or care what you have. Just insert a disk and copy away. All you have to know about the disk is how to get it into the drive. The Analysis feature lets you look at and print the actual structure of a disk - even the ones with "funny" formats.

WSPR lets you print to almost any printer using almost any control code. It's nearly magic and does a whole lot more than I can talk about here including letting you print *anything* your printer can print.

FILEFIX® gives you the ability to "fix" your "files" by adding linefeeds when your files are going from CP/M or IBM-DOS to LDOS/TRSDOS or take them away if you are transferring the other way. You can remove the control codes from a WordStar® document thereby converting it to a non-document file. The fix will also fix up Scripsit files so they can be used by CP/M and IBM-DOS based wordprocessors (you know - the real ones). All this is accomplished with the use of simple menus and boy, it is fast.

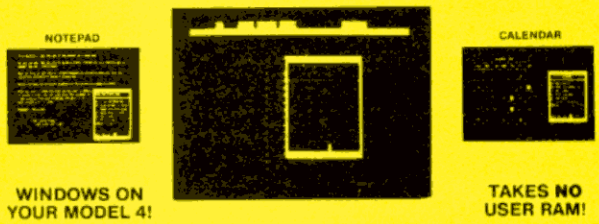
SYS2M requires 128K and our CP/M. The CCP and the BDOS are moved to drive M and the BIOS is modified to allow a Warm Boot from Drive M. So what you say. Well, you still have to have a disk in drive A but it no longer has to have the CP/M system resident. It can be anything. This little jewel copies frequently used programs to drive M and searches there first for all program requests resulting in much faster program loading. Slick isn't it?

AUTO is a little goodie that lets you issue multiple commands from the command line. Eliminates the *pain* of Submit. As in all the other parts of **MONTE'S TOOLBOX**, complete and comprehensive instructions are included and it's available right now.

MONTEZUMA MICRO

PRESENTS

MONTE'S WINDOW™



A touch of the keyboard opens a window in your screen for – a Note Pad, an Appointment Calendar, a Calculator, even a Mini Data Base. All yours for just $49! Need RAM? Monte's Christmas gift to you – 64K and the window, both for **$99!**

Once Upon A Time,

Monte Zuma, our Founder, President and King, has always had trouble keeping his desk organized. The Sidekick™ from Borland International would solve the problem, but alas, it was not available for CP/M®. So Monte asked his favorite nephew, the legendary LaMont E. Zuma (distant cousin to Rondo Talbot, a direct descendant of Monte Zuma hisself) to work on the problem as best he could during recess at the home. LaMont, a true legend in his own time, really outdid himself this time. A touch of both shift keys halts your application program in its tracks and up pops **Monte's Window™** *ready to use. What could be simpler? Put an end to the fumbling and pawing around the pile of papers on your desk. You will find* **Monte's Window™** *indispensable. When you are finished, break back to your application program and it resumes without error.* **Monte's Window™** *is truly a breakthrough. See for yourself – Look through* **Monte's Window™** *on* **your** *Model 4. How did you ever get along without it? See the page opposite for order information.* **Monte's Window™** *is available right now.*

MONTEZUMA MICRO

PRESENTS

MONTE'S BASIC

Your TRSDOS BASIC (01.01.00) will work the same, for the most part, under CP/M as it does under TRSDOS. However, for the most part isn't good enough. But, with some changes provided by our **BASCON**® program, you can be 100% compatible with the standard BASIC used with CP/M. True, you lose some of the TRSDOS BASIC features while gaining new features such as FILES, NULL, RESET, etc. **BASCON** alters your TRSDOS BASIC, which was included with your Model 4 when you bought it, so that it will function under CP/M. You must have the unaltered original TRSDOS BASIC as above in order to convert with **BASCON**. The program operation is fully automatic and quick. The resulting BASIC runs any CP/M 2.2 BASIC program that previously required MBASIC®. Programs written for TRSDOS BASIC may require modification to run correctly under the converted BASIC. Fully compatible with MBASIC. We even provide for additional documentation that is keyed by page number to your TRSDOS BASIC manual. **MONTE'S BASIC** is available right now. **$49**

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CP/M...The Software Key That Unlocks Your Model 4

CP/M is the standard 8-bit Z-80 operating system and many thousands of programs have been written to run under this system. With Montezuma Micro's CP/M you can run these programs on your Model 4/4P. Think about all those nationally known programs you've wanted to use. Programs like WordStar; dBASE II; SuperCalc; MultiPlan etc. With our version of CP/M 2.2 all those public domain programs on bulletin boards across the USA are available for free downloading. CP/M is the missing link that joins all this software to your Model 4/4P. Montezuma Micro's CP/M comes ready to use and requires no hardware modifications. This product has been awarded the best and highest ratings in the reviews and we are continuously improving it with you in mind. With our CP/M you get more than just a DOS. You get the other half of your Model 4/4P.

AVAILABLE NOW FOR IMMEDIATE SHIPMENT – Less Hard Disk Drive Support..... **$169**
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- Full range of floppy drive support. Dual-head and/or 80 tracks.
- Optional hard disk support allows positioning and selective assignment of logical drives. Easy backup routine.
- Memory drive allows the use of the other 64K RAM bank on 128K machines.
- Modem 7, a powerful public domain communications program furnished at no charge, allows for file transfer and remote database access such as CompuServ and The Source.
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Hard Decisions

Choosing the hard disk drive that's right for you.

by Vincent E. Meyer

Convincing yourself to buy a hard disk system is easy. The extra storage, faster input/output (I/O), and declining prices make buying a hard disk increasingly attractive.

But now comes the difficult part—deciding just what kind of hard disk to buy. You can choose a built-in system or one in a self-contained box; either way, you'll get a disk that provides anywhere from 5 to 156 megabytes of storage. It all depends on what you currently need—and what you'll need in the future.

To help you along, I'll describe how a hard disk works and how to put together a system for your TRS-80.

The Hard Facts

A TRS-80 hard disk system comprises the computer, the disk drive itself, the host adapter or interface, and a power source to run it all. I'll consider each component, starting with the drive.

The hard disk, sometimes called a Winchester disk, stores your data. It's called a hard disk because the actual recording medium is a rigid aluminum disk, or platter, with a magnetic coating. Hard disk drives can have more than one platter, depending on the drive's storage capacity. Having more than one platter, and more tracks per side than a floppy, gives a hard disk system its larger capacity. The only differences between the smaller hard disk drives and the larger ones are the number of platters and the number of tracks available.

The heads on a hard drive are much smaller than those used in a floppy disk drive. They don't contact the platters as the disk spins, but rather ride on a cushion of air thinner than a human hair.

The drive's works are sealed inside an airtight chamber called the hard disk bubble. Never break the seal on the disk bubble; any dust, dirt, or moisture that gets into the works will quickly destroy the drive.

A printed circuit card attached to the drive hosts the disk's electronics. This circuit board contains the read amplifier, which amplifies the signal from the heads, and circuitry to interface the index, track-zero detector, head positioning, and read/write logic to the disk controller board. These signals correspond to those that a floppy disk drive sends.

Hard disks rotate much faster than floppies, and the heads can step from track to track more quickly. This is why hard disk I/O is faster than floppy disk I/O.

The disk has a printed circuit card (the Winchester controller card) that does the same as the floppy drive's disk controller—it interprets commands from the computer and tells the disk drives what to do. It handles head positioning, track identification, error detection, formatting, and converting serial bits from the disk drive to 8-bit bytes that the computer can use.

The most common hard disk controllers for TRS-80s are in Western Digital's WD-1000 family; just about all TRS-80 hard disk systems use Western Digital's chip set or boards. (For more information on how a hard disk controller works, get a copy of the *Storage Management Products Handbook* from Western Digital [14747 Artesia Blvd., P.O. Box 666, La Mirada, CA 90638].)

The host adapter, a simple circuit that connects the disk controller to the host computer, determines when the CPU wants to access the disk (address decoding) and synchronizes the action of the disk controller with signals from the CPU (buffering).

If you're buying a hard disk system for a Model I, III, or 4, the host adapter might be mounted in a "pod" on the cable that plugs into the computer. In a Model II, 16, 16B, 1000, 1200, 2000, or 6000, the host adapter comes as a card that plugs into the system bus, and has a cable that runs out the back of the computer.

The power supply runs the drive, controller, and host adapter. Hard disk subsystems usually require their own power supply, even when you build in the hard disk system.

Most hard disk subsystems that come in a box have the drive, controller, and power supply together. Built-in systems will have these as separate parts.

The Big Decision

When you're ready to buy your system, you first have to decide what storage capacity you need. The most common way is to figure how many floppies' worth of data and programs you want to store. If the average floppy disk holds 180K, a 5-megabyte hard drive equals about 28 floppies. It actually works out to be a bit more than that because you won't have multiple copies of the system files, the bootstrap loader, and directories on the hard disk.

This sounds like a lot of data, but many people who buy 5-megabyte systems soon find all kinds of ways to fill their disks and run out of space. Since a 10-megabyte drive costs only about $200 more than a 5-megabyte drive, I recommend starting with at least 10 megabytes. Your hard disk should be able to handle all the data you'll want. And remember, most disk controllers can handle up to four drives, leaving the door open for expansion later on.

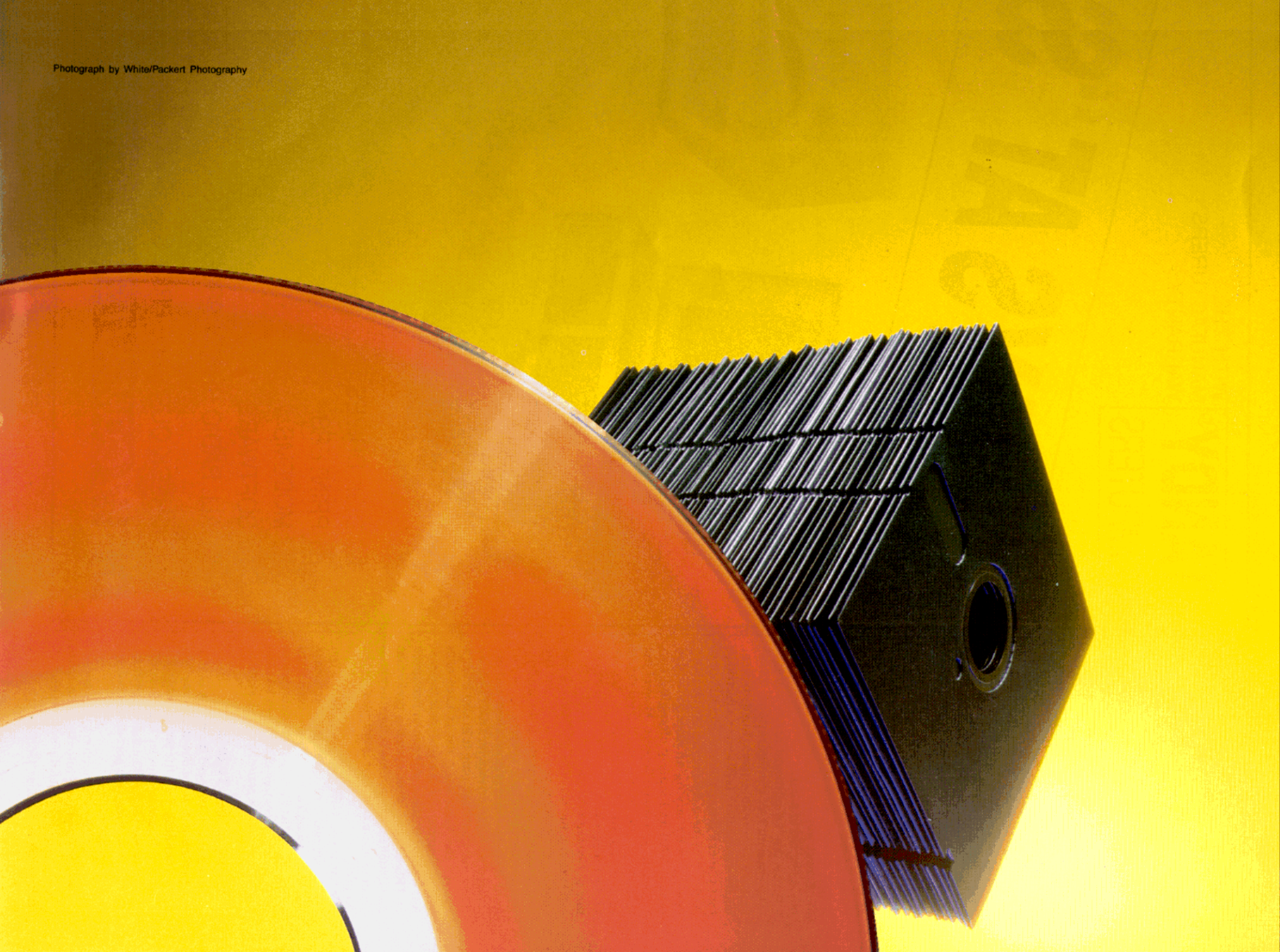
When deciding on how many megabytes of storage to buy, take a good look at the programs you'll be using. Say, for example, that you're using a computer in your business for accounts receivable, accounts payable, and general ledger. You'll need to allow space for all these programs, plus the data files for however long you keep your data on line. How many different spreadsheets are you going to want available? How many word processing documents?

Keep one axiom in mind: Once you start using a hard disk system, you'll never want to go back to floppies, so you had better make sure in advance that you have enough space for all the applications you commonly use.

You'll also need to choose between a built-in drive or one in a box (sometimes called an outboard drive).

Do-it-yourself kits for built-in systems are getting scarce; manufacturers have found that they're a headache to support. Installing a hard drive kit is a little more complicated than installing floppies, and a lot less forgiving if you make a wrong connection. This doesn't mean don't do it—it means that if you do it yourself you must follow the directions to the letter.

Most of the built-in kits I've seen have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Circle 282 on Reader Service card.

pretty good directions. If you're handy with electronic stuff, you probably won't have any problem. Call the manufacturer's tech support people if you have questions; better that they explain beforehand something you don't understand than tell you afterwards the damage you've just done by connecting the controller incorrectly. Better yet, have your friendly neighborhood computer technician install the system for you.

One slight disadvantage with some of the built-in systems is that they have a tendency to overheat. Most kits still on the market don't have this problem, but if you create your own system you should be sure that all the components have plenty of air space around them.

Built-in hard drives and the Model 4P don't mix too well. Although I've installed a couple, I haven't been too pleased. The 4P just doesn't have the space to fit everything comfortably and still allow for proper cooling and mounting. Probably the easiest way for 4P owners to go is to buy a system in a box.

If you buy an outboard drive, you can take your pick of configurations. Some feature removable pack hard drives, where the medium is sealed in a cartridge that you can change almost like a floppy. With one of these drives, you can add storage space by buying another cartridge (about $70) and simply changing cartridges as you would floppies. Most of the add-on systems feature fixed hard drives in sizes of 5, 10, 15, 20, 33, 40, 45, 50, 80, or 110 megabytes per drive, and either one or two hard drives.

If you buy the drive as a system, it will contain everything you need to get the system going, including the software drivers for the operating system. Systems from Bi-Tech come preformatted and initialized with the drivers for DOSPLUS already installed; just plug it in and start it up (see the Table for a list of hard disk manufacturers). Such a system is the easiest way to go. Many of the manufacturers of TRS-80 hard disk systems preformat and initialize the systems before they ship them to make sure that everything works properly.

What if you have two computers? You don't need two hard drives. All you need is another host and a multiplexer. Both Hard Drive Specialist and Bi-Tech Enterprises have multiplexers that allow up to 16 computers to share the same hard disk system.

Putting It All Together

Installing an outboard hard disk is simple. Set the box in an out-of-the-way corner of your desk. Plug the power cable into an outlet. If your computer is a Model III, 4, or 4P, connect the 50-conductor ribbon cable to the expansion port on the bottom of the machine.

Many of the manufacturers have special ROM chips that plug into the main board of the computer to let the system boot off

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Table. List of hard disk system manufacturers and dealers. Because of space limitations, only manufacturers supporting the Models III and 4 are included.

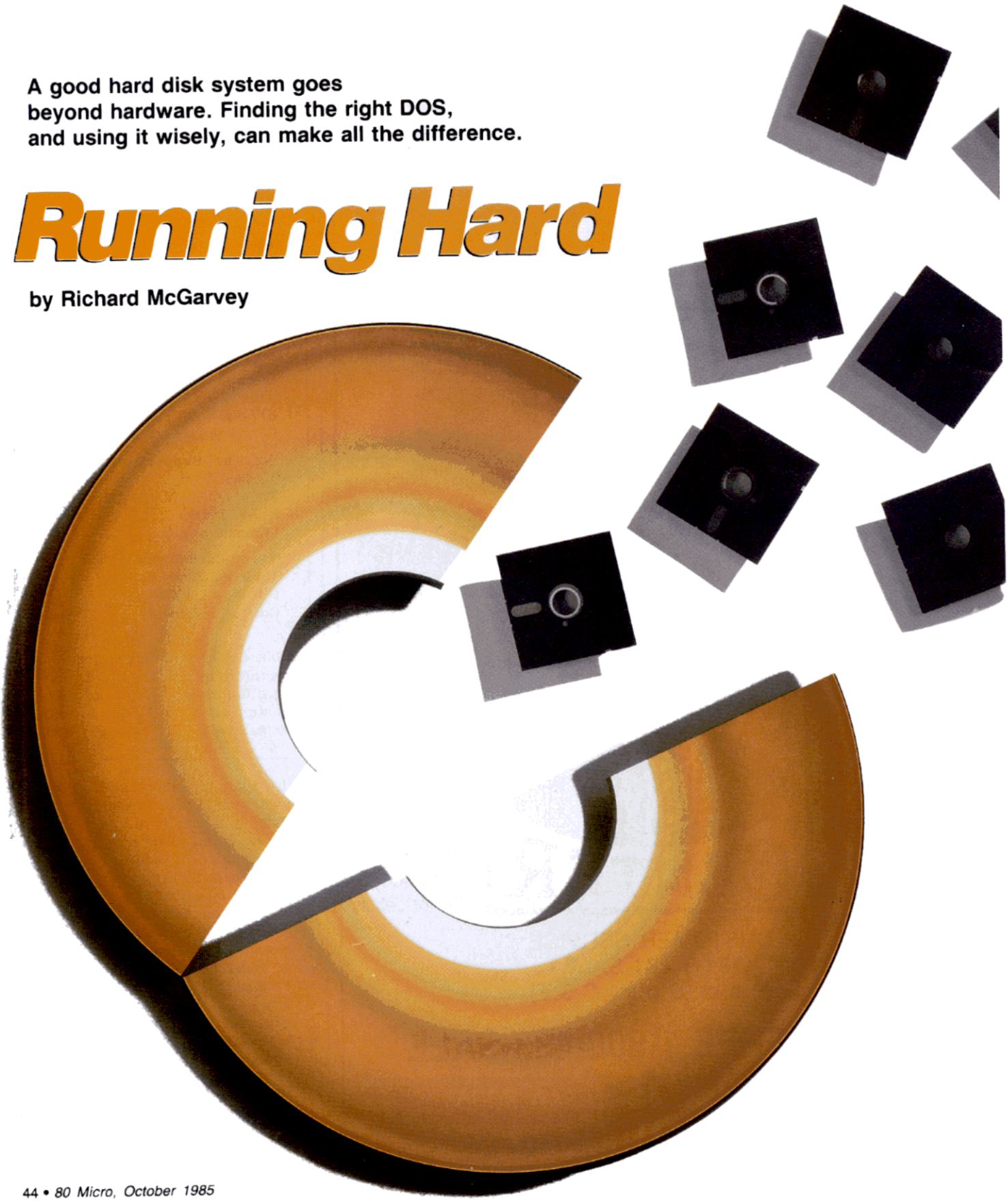
the hard disk. If you are using a boot ROM, you will have to take the computer apart to install it. It's not hard if you just take your time and follow the directions. If you are not using a boot ROM, you will need to use a disk to boot the system and load the hard disk's operating system. This disk comes with your system. Make a back-up copy and leave the master in a safe place.

To start the system, turn on the computer, insert the boot disk, and hit the reset button. That's all there is to it. If your system was shipped unformatted, you'll have to format the disk and install the software. Richard McGarvey discusses this in his article beginning on page 44.■

A good hard disk system goes beyond hardware. Finding the right DOS, and using it wisely, can make all the difference.

Running Hard

by Richard McGarvey



It doesn't make sense to spend hundreds of dollars on a hard disk drive and then treat it like a floppy. You're getting megabytes of storage and great access speed; you should take care to use them to best advantage.

In this article, I'll review one of the most important aspects of hard drive use—the software. I'll describe selecting a disk operating system (DOS), formatting and configuring for speed and space economy, and proper file management. I'll also point out some pitfalls to avoid.

The Right DOS

First, a brief look at what to expect from a DOS. You have several from which to choose: DOSPLUS, LDOS, and TRSDOS are the most popular. All are fine products, but you should look for the best features for your own system.

The DOS you select must work with the software, hardware, and applications you have in mind. The wider the variety of software and hardware it supports, the more valuable the DOS. The DOS must have a hard disk driver that's compatible with your hard drive. Also, it's best if the DOS supports earlier versions of itself; this allows for easier transfer of programs and data files.

DOS commands should make sense. To copy a file, the command should be Copy. The number of DOSes with unusual commands surprised me. Would you believe New for format? How about List for checking the directory? Avoid these. DOSPLUS, LDOS, and TRSDOS use conventional commands.

Be sure your DOS's commands give you complete control. For serious work, you must be able to do everything manually. This applies especially to formatting and configuring the hard drive. All DOSes I use have an automatic hard drive formatting feature, but only a few have user-definable formatting. You must be able to format by selecting head offset or cylinder offset (explained below), and configure by defining drive characteristics manually.

Each hard drive constitutes one physical drive, which you can divide into several logical drives. Choose a DOS that supports numerous logical drives. Avoid one that limits you to four logical drives. Eight is OK. Twelve is better. Numerous logical drives increase speed and storage.

Select a DOS that supplies utilities for downloading the hard drive to floppy disk. You must back up hard drives frequently. You'll appreciate a DOS that requires little effort on your part; remember, we're talking megabytes.

Saving Space

Why do you buy a hard drive? Storage space. Naturally, you don't want to waste it. Automatic formatting and a low number of logical drives rob you of valuable storage.

The directory steals space. Each directory allows limited entries, probably 255. If you have many small files, which is usually the case, you'll run out of directory space long before the drive fills. Once the directory is full, the remaining space is inaccessible. Wasted.

Use as many logical drives as you can. Each will be smaller, easier to handle, and have its own directory. That means you're less likely to run out of directory space before you fill the logical drive.

Numerous logical drives provide another space-saving benefit: reduced granule (gran) allocation. A granule is the smallest unit of disk space that DOS can allocate to a file. It's usually a multiple of one physical record. If the gran is 100 records, and you're storing a 50-record file, you've wasted 50 physical records. It's wise to have the smallest granule allocation possible.

The DOS does the allocating. You don't have direct control, but you can minimize gran size by increasing the number of logical drives. The more logical drives, the smaller the gran.

Gaining Speed

A hard drive is fast, but you can slow it down with poor file management. Before I explain further, a few definitions are in order.

Cylinder corresponds to "track" in floppy talk. There is a small difference, though. A cylinder runs through the disk, or platter, so it's three-dimensional. It's formed by the same track on each side of the platter. A cylinder consists of tracks over which the disk controller can position each read/write head simultaneously. Figure 1 represents a hard drive; note that the dotted lines depicting cylinder zero's location actually form a cylinder.

Head offset refers to the head number used. The first head is zero, the next 1, then 2, and so on. A head offset of 3 indicates the fourth head. A cylinder offset of 200 and a head offset of 3 means that the fourth head is over cylinder 200. In Fig. 2, which represents one type of format, each logical drive uses all four heads, but in Fig. 3, the division of logical drives is by head offset as well as cylinder offset. This gives each logical drive an address comprising its cylinder offset and head offset.

Configuration means assigning characteristics to each drive. The operating system must know what kind of drive it's dealing with. Figure 5 shows some typical configurations.

You can access the disk in one of two ways: by cylinder offset (CO), or by head offset (HO). Head offset is faster. Moving from head zero to head 3 is an electronic, not a mechanical, function. Cylinder offset requires a physical move from the current cylinder to the target.

Assume you've configured your logical drives so that drive 7 starts at cylinder 226 (see Fig. 2). The read/write head must move 226 cylinders before it starts to search that drive. If your word processor is on drive 7, and the file you're working on is on drive 4 (which begins at cylinder offset zero), then access time doubles. The head moves from drive 4 to 7, then back to 4. By putting the program and the file on the same drive, you cut access time in half.

Photograph by White/Packert Photography

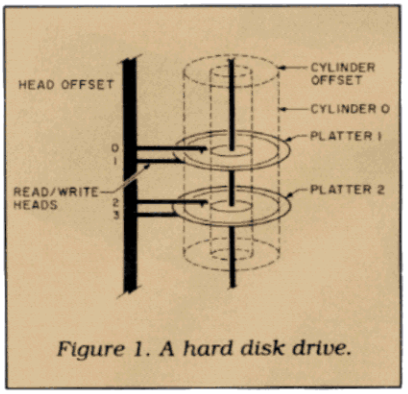


Figure 1. A hard disk drive.

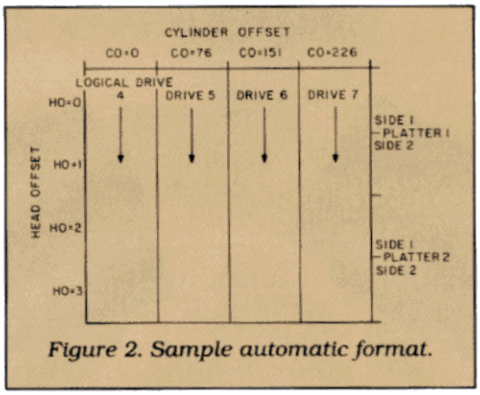


Figure 2. Sample automatic format.

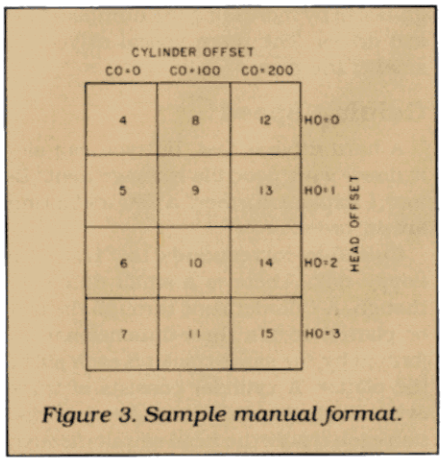


Figure 3. Sample manual format.

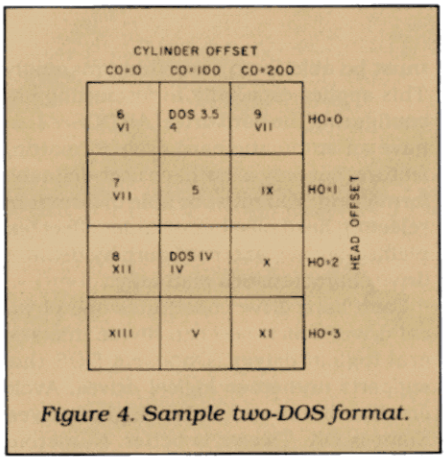


Figure 4. Sample two-DOS format.

If you format and configure your drive automatically, you might end up with four logical drives, each composed of a set number of cylinders (see Fig. 2). Each drive will use all heads. A cylinder will include a track on each side of each platter. The best you can do is put frequently used programs and files on drive 4, because the computer accesses it most often. Likewise, you should store the DOS on drive 4. Keep seldom-used files on drive 7.

Remember, fastest access is to the lowest cylinder offset and the lowest head offset. Increased head offset detracts little from speed. However, increased cylinder offset slows you down dramatically.

Format Follows Function

The next thing to consider is formatting the drive. As I mentioned above, automatic formatting limits your control. If you've selected a DOS that allows manual formatting, you can set up the drive to meet your needs.

Figure 2 represents an automatic format. The drive depicted has two platters (disks), each with two sides. The format procedure divided the physical drive into four logical drives numbered 4–7. Each logical drive uses all four heads, all four sides, and a specified number of cylinders.

Suppose you choose to format 12 logical drives manually. Figure 3 shows a sample

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result. Now you have drives 4–15. Each has a specific location defined by head offset and cylinder offset. Drive 4 is at CO = 0, HO = 0. Drive 15 is at CO = 200, HO = 3.

Your benefits from this format are these: Each logical drive is smaller, easier to manage, and has a full-size directory. Gran allocation reduces the minimum file size, thereby saving space. Frequently accessed programs can reside on different drives (4–7) without significant increase in access time. Access time between drives 4 and 8 increases slightly, by 24 cylinders, compared to drives 4 and 5 in Fig. 2. An increase of 24 cylinders, but an addition of three logical drives.

Another advantage to manual formatting is the ability to put more than one DOS on the hard drive. For example, I currently use a Model 4. I have some programs that operate in Model III mode only, some that run in Model 4 mode only, and some that work in both modes.

I could always set up the hard drive for the most commonly used DOS and keep the other on floppy, but I much prefer using my hard drive for everything. So I formatted the hard drive manually, then reserved, by configuration, some of the logical drives for Model 4 mode, some for Model III, and some for both modes. Next, I put the Model 4 DOS on one logical drive, accessible to the Model 4 DOS only, and

DOSPLUS IV Hard Drive Configuration

```
$00 :4   Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 100,HO = 2,TS = 32
$01 :5   Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 100,HO = 3,TS = 32
$02 :6   Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 0,HO = 0,TS = 32
$03 :7   Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 0,HO = 1,TS = 32
$04 :8   Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 200,HO = 0,TS = 32
$05 :9   Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 200,HO = 1,TS = 32
$06 :10  Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 200,HO = 2,TS = 32
$07 :11  Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 200,HO = 3,TS = 32
$08 :12  Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 0,HO = 2,TS = 32
$09 :13  Special,Fix,Size = 5,Sides = 1,Step = 6,Pdrive = 0,CO = 0,HO = 3,TS = 32
$10 :14  NIL
$11 :15  NIL
$12 :0   Floppy,Dden,Size = 5,Sides = 1,Step = 0,Pdrive = 0,MD
$13 :1   Floppy,Dden,Size = 5,Sides = 1,Step = 0,Pdrive = 1,MD
$14 :2   NIL
$15 :3   NIL
```

DOSPLUS 3.5 Hard Drive Configuration

```
$00 :4   Hard,Fix,Size = 5,Sides = 1,Step = 6,PD = 0,CO = 100,HO = 0,TS = 32
$01 :5   Hard,Fix,Size = 5,Sides = 1,Step = 6,PD = 0,CO = 100,HO = 1,TS = 32
$02 :6   Hard,Fix,Size = 5,Sides = 1,Step = 6,PD = 0,CO = 0,HO = 0,TS = 32
$03 :7   Hard,Fix,Size = 5,Sides = 1,Step = 6,PD = 0,CO = 0,HO = 1,TS = 32
$04 :8   Hard,Fix,Size = 5,Sides = 1,Step = 6,PD = 0,CO = 0,HO = 2,TS = 32
$05 :9   Hard,Fix,Size = 5,Sides = 1,Step = 6,PD = 0,CO = 200,HO = 0,TS = 32
$06 :0   Floppy,Dden,Size = 5,Sides = 1,Step = 3,PD = 0,MD
$07 :1   Floppy,Dden,Size = 5,Sides = 1,Step = 3,PD = 1,MD
```

Figure 5. Typical hard disk drive configurations.

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set up a similar Model III logical drive. The result is two hard drives, and two computers, in one.

It isn't possible to give complete step-by-step instructions for manual formatting in this article. Here are the basics:

First, assign the hard drive. You'll have to refer to your DOS manual for details.

Second, format the drive by CO and HO values. Be sure you back up any data on the drive first, or you'll lose it. Use the figures to guide you on logical drive layout.

Third, begin configuration. Again, consult your DOS manual. Basically, configuration means that you tell each drive position what characteristics it will have. Is it a hard drive or a floppy? How many tracks or cylinders? Where does it begin and end (CO and HO)? You'll also have to specify the number of sides, the step rate, and which physical drive you're formatting. If you have only one hard drive, the physical drive will be zero. If you have two, they'll be zero and 1. See Fig. 5 for sample configurations.

Finally, when you finish the configuration, save it as a boot file. Then put your DOS on the hard drive, according to the manual's instructions. Now, whenever you boot the floppy, it configures the hard drive as you specified and takes control of the hardware.

A Double DOS

To run multiple operating systems, the procedure is the same. When formatting is complete, configure the DOS so it recognizes only those logical drives you want. Then you can put two operating systems, or more, on various sections of the drive.

Figure 4 shows my two-system configuration. Drives shown in Roman numerals are Model 4 format, those in Arabic are Model III, and those in both are accessible by both. The figure also shows the logical drive containing the DOS. Note that DOS 3.5, indicating DOSPLUS 3.5 for the Model III, is available only to Model III, and is on low-numbered logical drive 4. DOS IV, indicating DOSPLUS IV for the Model 4, is available only in Model 4 mode, and is also on low-numbered logical drive IV. As far as I know, DOSPLUS is the only DOS that easily supports two operating systems installed on the same hard drive.

Note in Fig. 5 that the configuration corresponds to the diagram of the drive in Fig. 4. In DOSPLUS IV configuration, in the 00 position, drive 4 is a hard drive (special), it is on physical drive zero, the cylinder offset is 100, and the head offset is 2. In Fig. 4, CO = 100 and HO = 2 is the logical drive marked DOS IV - IV: logical drive 4.

Take a look at an overlap logical drive. In the DOSPLUS IV configuration in Fig. 5, check drive 6. It's CO = 0, HO = 0. Now look at the DOSPLUS 3.5 configuration. Check drive 6. It's also CO = 0 and HO = 0.

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Now jump to Fig. 4, and look at position CO = 0 and HO = 0. You'll see that it indicates logical drive 6 for both DOSes.

Forewarned is Forearmed

A few brief warnings. Different DOSes use different terminology. For example, DOSPLUS's SYSGEN command is not the same as TRSDOS's. The System command also differs between the two. Be certain that you read each command carefully, especially if you're familiar with one DOS and plan to change to another with the acquisition of a hard drive.

Hard drives crash. Not that they're unreliable, but even the best bug up on occasion. Back up everything that you can't afford to lose. The time might come when you'll be thankful you had that stack of floppy back-ups around.

If you've formatted manually, you can reformat a single logical drive without damaging the data on the others. If you formatted automatically, but you have a manual Format command available, and you know exactly where the target logical drive is, you can still reformat a single logical drive. If you only have automatic formatting, you'll have to start from scratch if one logical drive is damaged.

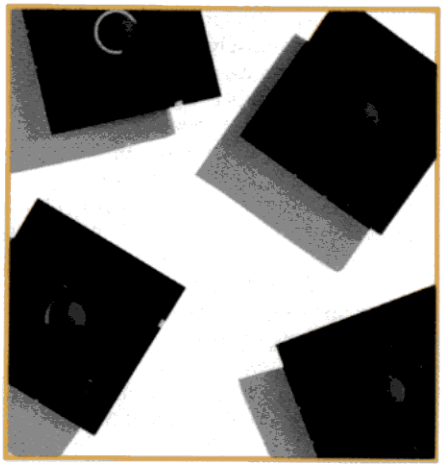
And Finally. . .

To summarize. Be careful when choosing a DOS. It's the brains behind your drive's operation. Look around a bit. Ask questions.

Manage your files carefully and use as many logical drives as possible.

Finally, allow me the soap box for a moment. Not so long ago, the people who bought small computers were hackers. They took time to learn the computer and software inside out. Time well spent. It seems that today's computer owners want to switch on and compute, with no real understanding of the machine. I advise you to learn your operating system and your hardware. Believe me, you will benefit. ■

You can reach Richard McGarvey at 221 Hirschfield Drive, Williamsville, NY 14221.



Have Data, Will Travel

Don't let file incompatibility get you down. Dave Rowell tells you how your software can share data files, even if you use several different Tandy machines.

Can the same software running on two different computers use the same data files? How about *different* software on two different computers?

If you accept the notion that machines like the Model 4 and Tandy 1000 are completely incompatible, the answer to both questions is "no." But incompatibility isn't the insurmountable problem many people think it is. In fact, many programs readily share files, and many others will do so with a bit of clever programming.

Last month's cover article, "*You* Can *Get There from Here*" (p. 36), showed you three ways to transfer files from one machine to another. This month, I'll discuss how you can now use those files. I'll focus on the three most common applications: word processing, spreadsheets, and data base managers. I'll also give you a simple Basic program that will let you convert a text file you've written on one word processor so you can use it with another.

Word Processing

A word processing file is the easiest to transport, since most word processors can save and read ASCII files. Once you move the file from one computer to another, you simply load it for editing. You can, for example, save a Model III Scripsit document in ASCII with the S,A option, send it to a Model 1000, and read it with DeskMate.

Occasionally, however, you'll run into problems with a word processor's control codes, the ASCII values zero–31 used for cursor and printhead movement. The ones you'll most commonly find are 9 (tab), 10 (line feed), and 13 (carriage return).

Scripsit, for instance, handles wordwrap without using control codes for line breaks. It reads ASCII files easily, but sees the carriage-return code used as a line break in ASCII files as a "hard" carriage return. Thus, Scripsit won't wordwrap an ASCII file, but instead ends each line with a return. The result is that it won't reformat paragraphs to a new line length until you've deleted the imported carriage returns.

Scripsit also has problems with the tab code, which shows up on the Model 4 as a right bracket. You should remove all tabs before transporting ASCII files to Scripsit. You can strip tabs and carriage returns with the program in Program Listings 1 and 2, which I'll explain later.

Pure ASCII

Several word processors write pure ASCII files but use special codes for text formatting. These codes are usually set apart from actual text by some rarely used ASCII character, and produce special effects like underlining and headers. For instance, the word processor I'm writing this article with uses the code "@style(spacing 2 lines)" to double space the printout. Although the codes are ASCII symbols (sometimes English words) and transfer readily, they mean nothing to another word processor, which interprets them as text.

Prosoft's Allwrite uses such codes, as does its predecessor, Newscript. However, the codes for each are slightly different. Fortunately, Allwrite includes a program that translates Newscript control commands to Allwrite commands. With other word processing programs, you must remove the formatting codes after you transfer the file or replace them with codes appropriate to the receiving word processor.

Many word processors use ASCII to represent characters, but pepper their text files with non-ASCII codes for format control. Scripsit's carriage returns and paragraph markers are non-ASCII. LeScript and Zorloff have small blocks of hexadecimal (hex) numbers embedded between lines with non-ASCII delimiters to mark them as format specifiers. The ASCII options of these programs strip out non-ASCII codes before saving, but you can get around the problem in other ways. Electric Pencil IBM PC files will transport as is if you don't use special features like underlining. LeScript reads native Scripsit and Zorloff files, but doesn't write to those formats. In addition to reading and writing ASCII, LeScript handles several Z80 assembler formats with non-ASCII codes, and Basic programs saved in ASCII.

WordStar (version 3.3 and before) is one program that reads ASCII files but can't save in ASCII once your document is in WordStar format. It alters the last character of each word by adding 128 to its code (setting the high bit). It treats soft carriage returns and some line feeds the same way.

You can "decode" WordStar files with the Supercross file transfer utility mentioned in last month's article. It has an ASCII transfer mode that filters out the high bit of each code, producing pure universal ASCII. If you already use another way to transport files between machines, the program in Listings 1 and 2 will do the job less expensively.

Spreadsheets

Moving spreadsheet files is almost as easy as moving word processing files. All spreadsheets I've looked at are completely transportable between any two TRS-80 or Tandy micros. Most spreadsheet programs can store files in ASCII format, so RS-232 transfer is simple. More recent spreadsheet software can usually load and convert the worksheets of earlier programs. Some can even export files to other formats.

VisiCalc stores files in two formats: its normal format (with the /VC file extension) and the data interchange format (DIF). If you look at either type with a file-editing utility, you'll see that all labels, numbers, and formulas appear in ASCII. I transferred VC and DIF files from a Tandy 1000 to a 4 with Supercross using the ASCII mode; both types of files successfully loaded into Model 4 VisiCalc and made the trip back to the 1000. I noticed some difference in the way the two versions of VisiCalc treat complex formulas; however, I attribute the changes to differences in arithmetic precision. The formulas were the same.

I can see little reason to use the DIF format for intermachine transfer. DIF files don't store formulas, but only an image of the spreadsheet as it appears on the screen.

System Requirements

Models I, III, 4, 100, 200, 1000, 1200, and 2000

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SYLK Transfer

You can't directly transfer Multiplan worksheets among the 4, 200, and 1000 unless you store them in the symbolic link (SYLK) format, because the program saves normal worksheets differently on each machine. A simple six-cell worksheet that I wrote used 1,999 bytes of disk space under MS-DOS, but only 750 bytes on the Model 4.

You can transport SYLK files as ASCII files. A transfer between the Model 4 and Tandy's MS-DOS machines preserves any windows you've created, as well as linking between different worksheets. Transferring several linked worksheets involved some trial and error on my part, so I'll detail the process.

When Multiplan loads a worksheet, even in SYLK format, it expects to find any supporting sheets in normal format. You therefore have to load the supporting linked sheets first and save them in normal format. If you don't, you'll get a "not a saved work file" message, and the loaded file, although appearing to be normal, won't save properly in either format.

Two other precautions. First, make sure that supporting worksheets keep their original names. The primary worksheet stores the names of all supporting worksheets as they are when linked. Second, clear the work space between saving and loading. After you save a worksheet in normal format, and before you load the next in SYLK format, clear Multiplan's workspace with the Transfer Clear command; otherwise, you'll merge the new file with the old one.

The RAM-based Model 200 Multiplan doesn't support linking, but it can read linked SYLK files without error. It takes whatever value was in linked cells when last saved as a fixed value and ignores the linkage to other worksheets.

I ran into a slight problem downloading SYLK files from the 1000 to the 200 via null modem, using Perfect Link and the 200's built-in communications program. I tried to load the file with Multiplan in SYLK mode, but failed with an "error reading line 1" message. I looked at the SYLK file with the 200's text processor (it's all ASCII) and found that the first character in the file was a carriage return. Deleting it fixed the problem.

Program Listing 1. Text file processor for Models 4, 100, 200, and MS-DOS machines.

```
10 REM     *** The 4 & MS-DOS version of Text File Processor ***
20 REM     *** For the 100 and 200, lines 130 and 140 must be replaced
30 REM     *** with the following 2 lines. (Can be used in MS-DOS, too.)
40 REM     *** 130 OPEN FI$ FOR INPUT AS 1
50 REM     *** 140 OPEN FO$ FOR OUTPUT AS 2
100 REM    *** Open files for input and output ***
110 LINE INPUT "Input file: ";FI$
120 LINE INPUT "Output file name: ";FO$
130 OPEN "I",1,FI$                          'sequential input
140 OPEN "O",2,FO$                          'sequential output
1000 REM   *** The input section ***
1010 IF EOF(1) THEN CLOSE : END             'check for end of file
1020 A$=INPUT$(1,1)                         'input one character
2000 REM   *** The processing section ***
3000 REM   *** The output section ***
3005 PRINT A$;                               'display output character
3010 PRINT#2,A$;                             'send character to outfile
3020 GOTO 1000                               'get next input character
```

End

Program Listing 2. Text file processor for Models I and III.

```
10 REM     *** The Mod III version - Text File Processor ***
20 CLEAR 256                          'string space
100 REM    *** Open files for input and output ***
110 LINE INPUT "Input file name: ";FI$
120 LINE INPUT "Output file name: ";FO$
130 OPEN "I",1,FI$                          'sequential input
140 OPEN "O",2,FO$                          'sequential output
1000 REM   *** The input section ***
1010 IF IN>0 GOTO 1050                      'check index for 0 value
1020 IF EOF(1) THEN CLOSE : END             'check for end of file
1030 LINE INPUT#1,AA$                       'if index = 0, get new string
1040 IF LEN(AA$) <> 255 THEN AA$=AA$+CHR$(13) 'if length 255, assume no CR
1050 IN=IN+1                                'increment index into string
1060 A$=MID$(AA$,IN,1)                      'get indexed character
1070 IF A$="" THEN IN=0 : GOTO 1000         'if null then end of string
2000 REM   *** The processing section ***
3000 REM   *** The output section ***
3005 PRINT A$;                               'display output character
3010 PRINT#2,A$;                             'send character to outfile
3020 GOTO 1000                               'get next input character
```

End

Program Listing 3. Processing modules for text file processor.

```
2001 REM   *** Module 1
2005 REM   *** Add linefeed to carriage return (TRSDOS to MS-DOS)
2010 IF ASC(A$)=13 THEN A$=CHR$(13) + CHR$(10)

2001 REM   *** Module 2
2005 REM   *** strip linefeed from CR/LF (MS-DOS to TRSDOS)
2010 IF B$=CHR$(13) AND A$=CHR$(10) THEN B$="a" : GOTO 1000
2020 B$=A$

2001 REM   *** Module 3
2005 REM   *** print ASCII codes of input file
2010 LPRINT ASC(A$); : GOTO 1000

2001 REM   *** Module 4
2005 REM   *** Convert WordStar files to ASCII (strip high bit)
2010 A$=CHR$(ASC(A$) AND 127)

2001 REM   *** Module 5
2005 REM   *** Convert ASCII to TRSDOS Scripsit
2010 IF A$=CHR$(10) THEN GOTO 1000
2020 IF A$=CHR$(13) THEN B$=A$ : GOTO 1000
2030 IF A$=CHR$(9) THEN A$="     "          '5 spaces
2040 IF B$=CHR$(13) AND (A$=" " OR A$="     ") THEN A$=CHR$(141)+A$
2050 B$=A$
```

End

Crossover

Several spreadsheet programs can read worksheets from other programs. Multiplan reads VisiCalc files, although it doesn't save in VisiCalc format. On MS-DOS machines, Lotus translates VisiCalc and dBase II files both ways.

The Spreadsheet Interchange Program (SIP) by Micro-Systems Software translates among a variety of spreadsheet formats on MS-DOS machines: Lotus, Multiplan SYLK, VisiCalc, SuperCalc 3, Miracle, and Ability. Of course, some spreadsheets have features that others don't, so don't expect translation to be perfect.

One nice feature of spreadsheet programs is that you can save all or part of a spreadsheet as an ASCII print file. You can then insert the file into a document as a table of figures already labeled. It's easier than typing in the table yourself. Because print files are in ASCII, you can transport them between machines as you would any text file.

If you're importing a spreadsheet print file with LeScript, you should use clear-U to load the file or you'll strip out all the "extra" spaces, ruining the table format.

Data Base Blues

A data base file, by nature, isn't readily translatable by another data base program or by another type of application. Profile data files are pure ASCII without special delimiters, but what program is going to know where one record starts or

ends, how many fields are in a record, or what each field represents? If you're going to move information from a data base manager to some other application, the software must provide that capability.

Most data base programs will integrate with a word processor to address form letters. Some will send reports of sorted, user-selected information to a print file. You can transport this ASCII text file, perhaps a list of clients sorted by area code, to another machine or application for inclusion in a letter or report.

PFS:File data files aren't ASCII, but you can move them among the many Radio Shack machines running that program. I transferred a small PFS:File file from the 2000 to the Model 4 using Supercross's image mode and loaded it without a problem. I used Super Utility to look at the files on both machines, and found that they were identical. Both PFS:File and Report output ASCII print files.

Profiles III + and 4 + don't produce print files of reports, but you can set up both versions to interface with Scripsit or VisiCalc, to print form letters or enter data into a spreadsheet.

Basically Speaking

You can also move Basic programs between machines by several methods including ASCII transfer, but they probably won't run when they get there. For example, you must set off the key words in Model I/III Basics with spaces before the Model 4 or an MS-DOS computer will even look at them. Also, some commands like PRINT@ will give you problems.

You can move Basic programs by several methods, but they probably won't run when they get there.

A conversion program will do most of the work. Educational Micro Systems (P.O. Box 471, Chester, NJ 07930) produces CONV3TO4, CONV3TOPC, and CONV3T02000. They do all the grunt work, inserting spaces, translating PRINT@ to Locate, adjusting tabs, and flagging any statement that might not work as intended.

Another III-to-4 conversion program you can check out is Convert, published in the April 1984 issue of *80 Micro* ("Redevelopment Program," p. 96). Convert 2000 by Soft Horizons (RD1, Box 432, State Highway 83, Cape May Court House, NJ 08210) will convert older TRSDOS Basics to the 2000, while John Harrell's Change (2000 Plus, October 1984, p. 178) will convert I, III, and 4 Basic programs to Model 2000 format.

Transmutations

It's nice when existing software lets you transport, transform, and translate data files. But sometimes the software for a particular transformation isn't available, or a little file manipulation might do a more thorough job. It's not that hard to clean the extra carriage returns from an ASCII file before loading it into Scripsit, or to strip the 8th bit from characters in a WordStar file to get pure ASCII. You can adapt the short Basic program in Listings 1 and 2 for all sorts of file manipulation.

A disk editor is an important tool if you're going to do much file processing. Super Utility, available for the I, III, 4, and MS-DOS machines, lets you view both hex and ASCII representations of any file's contents. The Norton Utilities package does the same for the MS-DOS machines. You can also use Debug to look inside data files with the D (for dump) command. You

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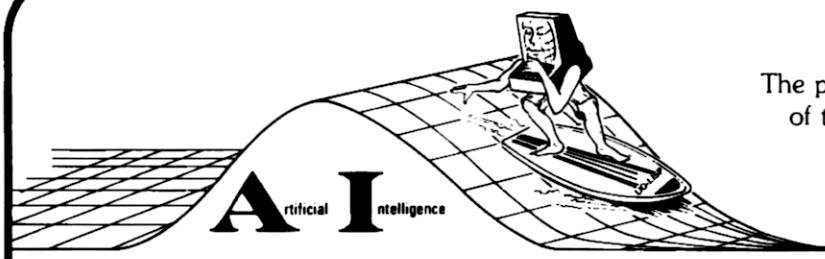

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can even modify the little Basic file processor to display or print out the contents of a file.

Once you've examined a file, you'll know what you can change and how. You can also use a file editor to check your results.

I've included versions of the file processor for all Radio Shack Basics. The program makes file manipulation, character by character, simple, and you don't have to understand Basic file input/output statements to use it. Of the program's four modules, you only need worry about the file processing section (lines starting with 2000).

I've included several processing modules to demonstrate the program's utility (see Program Listing 3). All you must know about the rest is that the input module (lines starting with 1000) provides the next character in the input file, and the output module (lines starting with 3000) writes the results of the processing section to the output file. (I borrowed the idea for this program from Howard Benner on a CompuServe special-interest group.)

To write your own plug-in processing modules, use your disk editor to look at the file in question. Note the hex values of any characters you want to change or delete (you can identify special codes because they use nontext characters). Change the hex values to decimal. These are the values you'll use in the CHR$ statements.

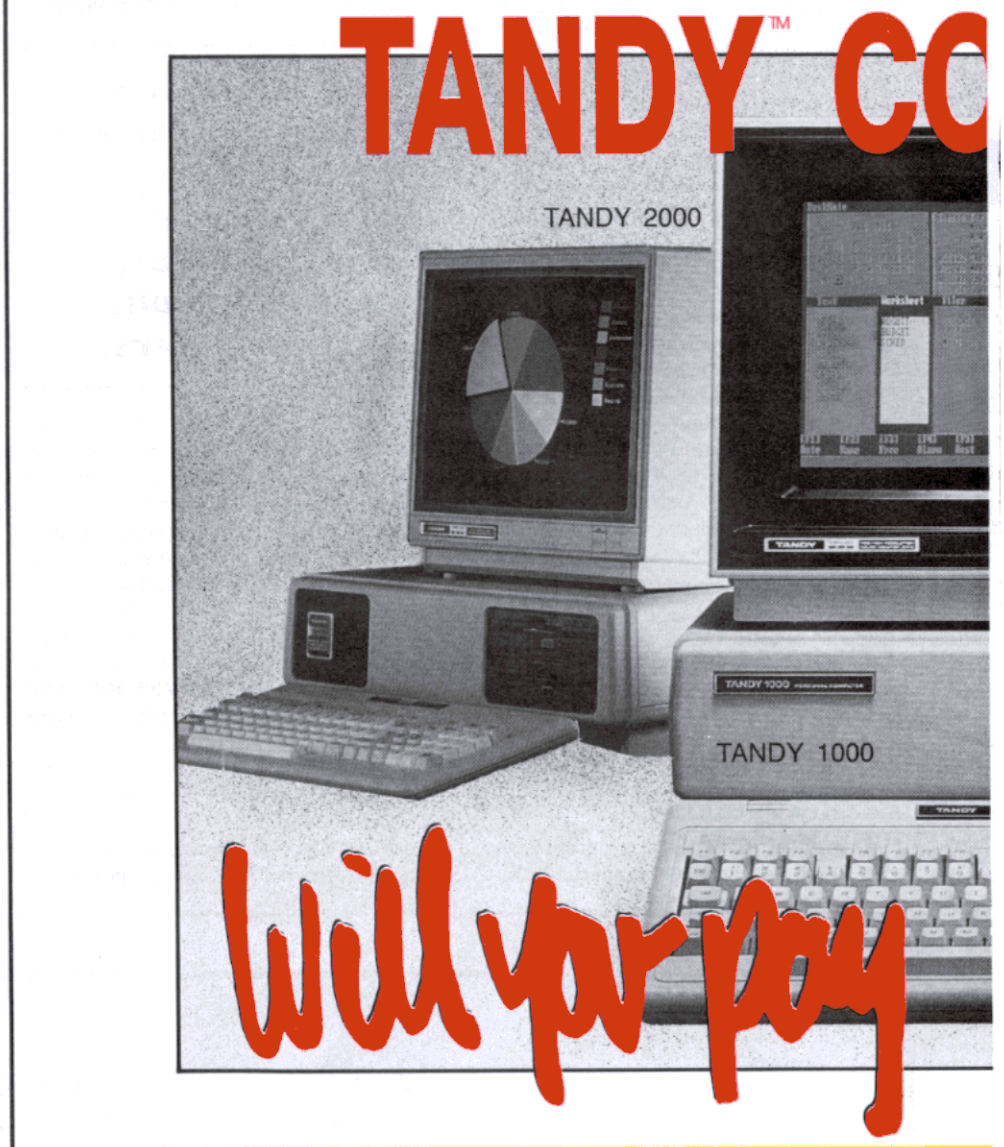
Keep several things in mind. The input module passes a single character to the processing module, which modifies it if necessary and feeds the results to the output module. The input module takes care of closing all files when it reaches the end of the file. The output module both writes the output file to disk and displays the characters so you can monitor its progress.

In the processing module you modify or add to selected characters with If. . .Then statements. You delete characters by skipping the output module with a GOTO 1000.

The first processing module takes care of TRSDOS-to-MS-DOS ASCII transfers. TRSDOS Basic, for example, uses code 13 (0D hex) alone to mark the end of a line in ASCII program listings, whereas GW-Basic expects a line feed (10 or 0A hex) to follow the 13. The processing module tests if the input character is an ASCII 13 and, if yes, adds a CHR$(10).

The second module handles the opposite situation, stripping the line feed from a carriage return/line feed combination for going from MS-DOS to TRSDOS. The program leaves alone line feeds not following a 13. Usually, only the end-of-line sequence causes problems.

This situation is trickier because the processor must keep track of the previous character by storing it in B$. When the last character code is 13 and the present code is 10, the program bypasses the output module, effectively deleting the line feed. When this happens, the program



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sets B$ to some other character ("a") in case the next character is a line feed that it shouldn't delete.

If you haven't got a file-editing utility to examine the contents of a text file, you can use module 3 to print the ASCII code of all characters in decimal form. After the program prints each code, the processing module sends control directly back to the input module so that the program doesn't write an output file.

Module 4 strips the 8th bit from WordStar file codes by anding 127 with each character. WordStar isn't the only program using the 8th bit to mark particular ASCII characters. Scripsit carriage returns are standard carriage returns with the 8th bit set (141 or 8D hex).

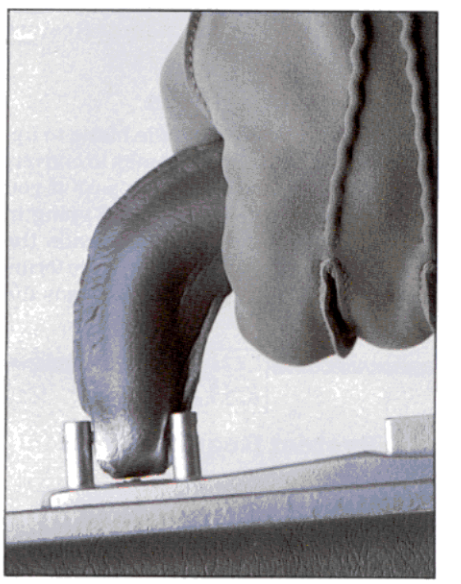
The last module is more complex. It preprocesses ASCII text files for Scripsit, stripping out carriage returns and line feeds. It also converts tab codes (9) to five spaces. If a space or tab follows a carriage return, the module assumes that a new paragraph is starting and inserts the Scripsit carriage return code (141). The module as is messes up any program listings included in the text file, but you could add a line that tests for numbers following a carriage return (VAL(A$)<>0).

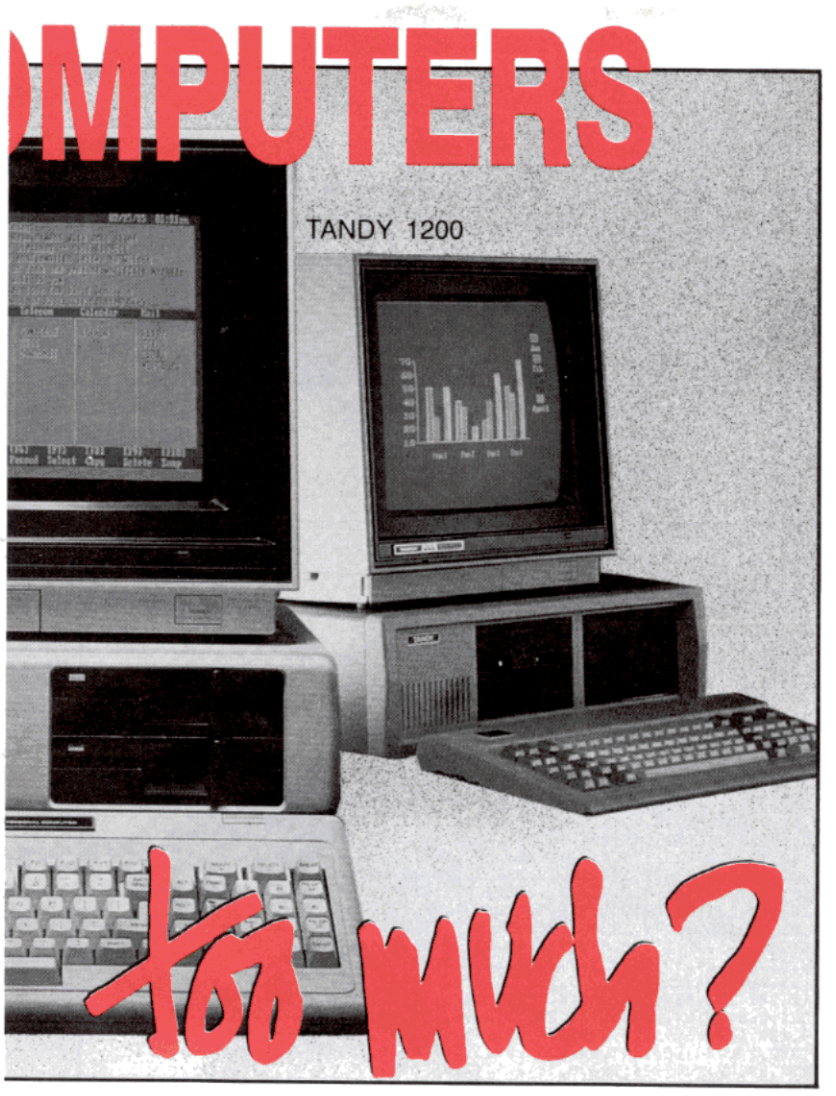
With this program you're no longer tied to what your application software allows. The code is short enough so you can easily modify it, and you'll have fun watching a processing module you've written yourself scroll text down the screen.■

Dave Rowell is a technical editor at 80 Micro.

Related Article

Dixon, Bradford N., "You *Can* Get There from Here," September 1985, p. 36. A tutorial on transferring files between computers.





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Files from the Crypt

Bring 'em back alive— Restore resuscitates Model 4 files you've accidentally killed.

If you do any amount of work with disk files, you've probably experienced a time when you wish you could turn back the clock and answer "No" to a purge prompt. I once accidentally purged a file that I hadn't backed up. After several hours of experimentation, I managed to recover the file by manually reconstructing the directory entries, but this was an involved process. Not wanting to waste so much time in the future, I sat down and wrote a program to do the job for me.

The resultant program, Restore, recovers any Model 4 file that you've purged or removed. I've used it on every kind of file, including DIR/SYS and Boot/SYS, with complete success. You can even recover protected files, since Restore doesn't need to know the password to work.

You should use Restore immediately after killing a file; otherwise, TRSDOS might overwrite the file with another. You run the program by typing in, at DOS Ready, RESTORE FILENAME/EXT:d, where "d" represents the appropriate drive number.

You can also execute the program from Basic by typing in SYSTEM "RUN RESTORE FILENAME/EXT:d" or simply SYSTEM "RUN RESTORE." Be sure to use the extension if the file has one. If you don't include the file name, Restore prompts you for it.

Restore's Operation

Restore first converts a file name to uppercase and pads it with blanks to convert it to directory format. It then asks if you really want to recover the file. Typing in any character other than "Y" ends the program. If you type in "Y," Restore forms the hash code for the file name, loads the

LOAD 80

System Requirements

Model 4
64K RAM
Basic

Program Listing. Restore.

```
100 DATA 5,9,0,0,0,82,69,83,84,79,82,5,9,0,0,38,32,32,32
110 DATA 32,32,32,1,254,0,38,237,115,177,42,229,62,10,33,169,41,239,194
120 DATA 97,41,225,62,13,190,194,49,38,62,10,33,129,41,239,194,97,41,62
130 DATA 9,33,201,42,6,31,14,0,239,194,97,41,218,89,41,33,201,42,17
140 DATA 232,42,62,78,239,62,19,194,97,41,33,232,42,17,189,42,6,9,126
150 DATA 254,3,40,50,254,47,40,14,254,58,40,35,18,35,19,16,238,62,19
160 DATA 195,97,41,17,197,42,35,6,4,126,254,3,40,21,254,58,40,10,18
170 DATA 35,19,16,242,62,19,195,97,41,35,126,230,7,50,185,42,6,11,14
180 DATA 0,17,189,42,26,169,7,79,19,16,249,121,183,32,1,60,50,188,42
190 DATA 33,151,41,62,10,239,33,232,42,62,10,239,33,166,41,62,10,239,62
200 DATA 9,33,201,42,1,0,3,239,194,97,41,218,89,41,58,201,42,254,89
210 DATA 202,194,38,254,121,202,194,38,195,89,41,58,185,42,79,62,33,239,62
220 DATA 32,194,97,41,62,15,218,97,41,6,16,17,2,20,237,67,179,42,58
230 DATA 185,42,79,62,85,33,9,45,239,194,97,41,237,83,186,42,6,8,221
240 DATA 33,9,45,237,67,183,42,221,34,181,42,221,1,254,252,38,203,0,126
250 DATA 194,46,39,221,229,225,1,9,45,183,237,66,125,50,8,43,6,11,17
260 DATA 189,42,26,221,190,5,194,46,39,221,35,19,16,244,221,42,181,42,221
270 DATA 203,0,102,194,105,41,195,77,39,221,42,181,42,1,32,0,221,9,237
280 DATA 75,183,42,16,182,237,91,186,42,28,237,75,179,42,5,194,216,38,195
290 DATA 113,41,58,185,42,79,62,85,33,9,43,237,91,186,42,30,0,239,194
300 DATA 97,41,58,185,42,79,62,85,33,9,45,237,91,186,42,239,194,97,41
310 DATA 58,8,43,198,22,79,6,0,33,9,45,9,58,214,43,230,7,71,4
320 DATA 221,33,9,43,94,22,0,221,25,35,126,35,229,245,230,224,7,7,7
330 DATA 79,12,241,230,31,60,87,62,0,55,104,44,23,45,13,55,63,32,249
340 DATA 95,221,166,0,194,46,39,123,221,166,96,194,46,39,21,202,205,39,45
350 DATA 40,6,123,183,23,95,24,230,104,221,35,62,1,95,24,222,225,126,254
360 DATA 254,202,220,39,254,255,202,252,39,195,125,39,35,126,230,31,198,2,95
370 DATA 58,187,42,87,126,230,224,8,58,185,42,79,33,9,45,62,85,239,194
380 DATA 97,41,1,254,248,39,8,195,116,39,58,185,42,79,62,85,33,9,43
390 DATA 237,91,186,42,30,0,239,194,97,41,58,185,42,79,62,85,33,9,45
400 DATA 237,91,187,42,58,8,43,198,22,79,6,0,33,9,45,9,58,214,43
410 DATA 230,7,71,4,221,33,9,43,94,22,0,221,25,35,126,35,229,245,230
420 DATA 224,7,7,7,79,12,241,230,31,60,87,62,0,55,104,44,23,45,13
430 DATA 55,63,32,249,95,221,182,0,221,119,0,21,202,113,40,45,40,6,123
440 DATA 183,23,95,24,237,104,221,35,62,1,95,24,229,225,126,254,254,202,128
450 DATA 40,254,255,202,160,40,195,40,40,35,126,230,31,198,2,95,58,187,42
460 DATA 87,126,230,224,8,58,185,42,79,33,9,45,62,85,239,194,97,41,8
470 DATA 195,31,40,33,9,43,58,187,42,87,30,0,58,185,42,79,62,54,239
480 DATA 194,121,41,33,9,44,58,187,42,87,30,1,58,185,42,79,62,85,239
490 DATA 194,121,41,58,186,42,214,2,79,58,8,43,177,79,6,0,33,9,44
500 DATA 9,58,188,42,119,58,186,42,95,58,185,42,79,58,187,42,87,33,9
510 DATA 45,62,85,239,194,121,41,58,8,43,79,1,254,244,40,6,0,221,33
520 DATA 9,45,221,9,221,203,0,230,221,229,221,33,9,45,58,187,42,87,58
530 DATA 186,42,95,58,185,42,79,33,9,45,62,54,239,194,121,41,221,225,221
540 DATA 126,30,254,254,194,64,41,221,126,31,230,31,198,2,50,186,42,221,126
550 DATA 31,230,224,50,8,43,221,126,31,79,6,0,195,211,40,33,9,44,58
560 DATA 187,42,87,30,1,58,185,42,79,62,54,239,194,121,41,33,149,42,62
570 DATA 10,239,33,0,0,237,123,177,42,201,246,192,79,62,26,239,24,240,33
580 DATA 244,41,62,10,239,24,232,33,24,42,62,10,239,24,224,33,43,42,62
590 DATA 10,239,24,216,10,16,70,105,108,101,32,116,111,32,82,69,83,84,79
600 DATA 82,69,58,17,32,32,3,10,82,69,83,84,79,82,69,32,102,105,108
610 DATA 101,32,3,63,32,3,10,82,69,83,84,79,82,69,32,49,46,48,46
620 DATA 48,32,45,32,67,111,112,121,114,105,103,104,116,32,49,57,56,52,32
630 DATA 98,121,32,82,97,121,109,111,110,100,32,67,46,32,66,111,103,103,115
640 DATA 44,32,97,108,108,32,114,105,103,104,116,115,32,114,101,115,101,114,118
650 DATA 101,1,219,240,41,100,46,10,13,70,105,108,101,32,97,108,114,101,97
660 DATA 100,121,32,97,99,116,105,118,101,32,45,32,99,97,110,39,116,32,82
670 DATA 69,83,84,79,82,69,13,67,65,78,39,84,32,82,69,83,84,79,82
680 DATA 69,32,70,73,76,69,13,16,65,78,32,85,78,82,69,67,79,86,69
690 DATA 82,65,66,76,69,32,68,73,82,69,67,84,79,82,89,32,87,82,73
700 DATA 84,69,32,69,82,82,79,82,32,72,65,83,32,79,67,67,85,82,82
710 DATA 69,68,46,17,10,16,84,72,69,32,73,78,84,69,71,82,73,84,89
720 DATA 32,79,70,32,84,72,69,32,84,65,82,71,69,84,32,68,73,83,75
730 DATA 32,73,83,32,78,79,87,32,83,85,83,80,69,67,84,33,17,13,70
740 DATA 73,76,69,32,83,85,67,67,69,83,83,70,85,76,76,89,32,82,69
750 DATA 83,84,79,82,69,68,46,13,0,0,0,0,0,0,0,0,0,0,0,0
760 DATA 0,32,32,32,32,32,32,32,32,32,32,32,3,1,3,8,43,0,2
770 DATA 2,0,38
780 '****  RESTORE/BAS created @ 16:49:58 on 04/04/85.  ****
790 CLS : LINE INPUT "DESTINATION FILE NAME:  ";DEST$
800 OPEN "O",1,DEST$
810 FOR X=1 TO 1276 : READ Y : PRINT #1, CHR$(Y);: NEXT X
820 CLOSE 1
```

End

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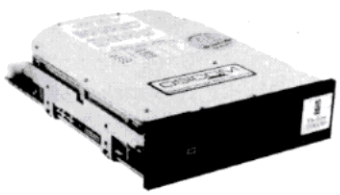

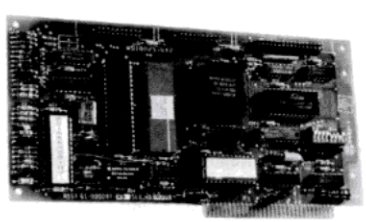

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Restore tests each GAT entry to find if TRSDOS has allocated the granule to another file.

directory one sector at a time, and searches each sector for a match. If it finds one, it checks that directory entry to make sure the file is inactive. If Restore finds the file active, it ends the program.

Alternatively, if Restore finds a matching inactive file entry, it tests each granule allocation table (GAT) entry to find out if TRSDOS has allocated that granule to another file. If so, you've already overwritten the file, and you can't recover it. Restore then searches for another matching file name.

If all granules are free, the program restores the entries that correspond to your file. It then loads the hash index table (HIT) into memory and restores the file's primary directory entry (FPDE). It also tracks down and restores the hash codes for any file extended directory entries (FEDEs). At the same time, it sets the file-active bit in each entry. Your program is now completely restored.

Entering the Program

Restore is an Assembly-language program, but I've included a Basic listing that creates a command file for you. Simply type in the Program Listing and run it. If you want to study the Assembly-language version, you can disassemble the Listing; the source code is also available on the October 1985 issue of Load 80 (see p. 64 for information about ordering).

Potential Problems

You might encounter several minor problems with Restore. First, if you have an active file with the same name as the one you want to restore, you could end up with two files with the same title. If this happens, you'll need to rename one of the files.

You might also have two inactive files with the same name. You should check to make sure you restored the right one. If you got the wrong one, rename it, kill it, and run Restore again.

Finally, be careful if you have restored a /CMD file. You should always make a back-up copy before you try to execute the program. ■

You can write to Raymond C. Boggs at 4735 Feigley Road S.W., Port Orchard, WA 98366.

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Key Notes

Program the Model 4/4P's function keys to execute commands from DOS or Basic, or customize them for your own applications.

Tandy put three programmable function keys on the Model 4/4P, but that's only half a loaf. They didn't provide a satisfactory way to program them. You can use Basic's INKEY function to assign commands in your own programs, but I wanted an all-purpose driver routine that would let me access the keys during DOS-level file maintenance or assign specific commands for use with applications.

My function key filter, PF/FLT, began life as a simple routine that programmed the Model 4 function keys to invoke Basic editing commands. Before long, it grew into its present form, a completely programmable interface between user and keyboard (see the Program Listing). The filter lets you use the default key assignments I've provided or specify an ASCII file with commands of your choice. Also, a dynamic programming capability lets you assign the shifted function keys a new command (or any string up to 80 characters) at any time.

I use PF/FLT with almost all my applications, and have a different boot disk for each program with the appropriate commands installed via SYSGEN.

Filter Tips

The Listing's fully commented source code describes the filter routine. Note that I used DOS version-specific code for the dynamic programming routine. If your assembler doesn't support conditional assembly statements, you'll have to adjust the program to eliminate the extraneous code.

TRSDOS 6.0 and 6.1 don't support the save/load line mode of the @VDCTL supervisor call (SVC). Therefore, for these DOSes, PF/FLT erases line 23 of the display when programming a key. Under TRSDOS 6.2, the filter saves and restores line 23's con-

LOAD 80

System Requirements

Model 4
64K RAM
Assembly language
Editor/assembler

Key	Command	Description
F1	LIST	Invokes Basic's List command.
F2	EDIT	Invokes Basic's Edit command.
F3	RUN <enter>	Executes Basic's Run command.
Shift-F1	DIR :0 <enter>	Displays drive-zero directory.
Shift-F2	DIR :1 <enter>	Displays drive-1 directory.
Shift-F3	SYSTEM	Invokes a DOS command from Basic or returns to system.

Table. PF/FLT's default commands.

Program Listing. PF/FLT.

```
00100 ;*************************** PF/FLT *****************************
00110 ;                            Version 3.2
00120 ; A filter for the TRS-80 Model 4 operating under the
00130 ;       TRSDOS 6.x.x system to assign the following
00140 ;       operations to the function keys.........
00150 ;               F1 - "List "
00160 ;               F2 - "Edit "
00170 ;               F3 - "Run" <CR>
00180 ;       <shift> F1 - "Dir :0" <CR>
00190 ;       <shift> F2 - "Dir :1" <CR>
00200 ;       <shift> F3 - "System "
00210 ;
00220 ; Alternately, an ASCII text file containing six lines
00230 ;       of not more than 80 characters each may be
00240 ;       specified in the set command line.  The default
00250 ;       filespec extension for this file is "/FKF" for
00260 ;       "Function Key File".
00270 ;
00280 ; The syntax for the set command is:
00290 ;     SET *PF PF [/FLT] [(f="filespec"[/FKF],P={N})]
00300 ;  where:
00310 ;               "filespec"=the "FKF" file to load
00320 ;                       P = "NO" to load the short filter
00330 ;
00340 ; Insert into the keyboard input (*KI) chain with:
00350 ;      FILTER *KI using *PF
00360 ;
00370 ; <CLEAR><SHIFT><Z> prompts "Key (shifted)? " and waits for entry
00380 ;       of the function key to program and then allows input
00390 ;       of a command string of up to 78 characters to be
00400 ;       assigned to the selected key.  Use <BREAK> or <ENTER>
00410 ;       blank line to re-assign the original string to "key".
00420 ;
00430 ;*************************************************************
00440 ;
00450 ;*************************************************************
00460 ;       Set up DOS Version.....................
00470 ;       if your assembler does not support conditionals,
00480 ;       see the Version dependent code in routine GETINP.
00490 ;       Do NOT enter the code for saving line 23 unless you
00500 ;       are using TRSDOS version 6.2.x.
00510 ;
00520 DOSVER  EQU     62      ;IF 6.2.X ELSE 61 OR 60
00530 ;*************************************************************
00540 ;
00550 ;       Supervisor Call Equates.................
00560 DSPLY   EQU     0AH     ;DISPLAY A MESSAGE LINE
00570 LOGOT   EQU     0CH     ;DISPLAY & LOG A MESSAGE
00580 CHNIO   EQU     14H     ;PASS TO NEXT MODULE IN DEV CHAIN
00590 ERROR   EQU     1AH     ;POST AN ERROR MESSAGE
00600 HIGH    EQU     64H     ;GET/PUT HIGH$/LOW$
00610 FLAGS   EQU     65H     ;POINT IY TO SYSTEM FLAGS
00620 FSPEC   EQU     4EH     ;VERIFY FILESPEC
```

Listing continued

tents in the program mode. You may also have to change the PSECT statement to ORG depending on your assembler.

PF/FLT fully conforms to TRSDOS 6.X's filter routine requirements. This means that you can insert it into the keyboard input (*KI) software driver chain using the Set and Filter commands. You do this either from DOS Ready or from a job control language (JCL) file. The input routine for the dynamic programming function avoids using the system line input SVC, preventing any conflict with the job control language.

After you assemble the program, you can install the filter by typing in from DOS Ready:

```
SET *PF TO PF
FILTER *KI *PF
SYSGEN
```

You must press the enter key after typing in each line. The third step, SYSGEN, is optional. It makes the filter part of the operating system, meaning it loads automatically when you boot up the disk.

The Table lists the filter's six default commands. Note that the commands for F3 and shift-F1 and shift-F2 execute automatically; you don't have to press the enter key.

Keys to Customizing

PF/FLT also lets you specify a six-line ASCII file containing command strings for each function key. You must create the file using TRSDOS's Build command or a text editor capable of saving the file to disk in pure ASCII format.

Typing in the following lines creates a sample file to insert in the filter. You should press the enter key after typing in each line:

1. BUILD YOURPF/FKF
2. DIR :0 (S,I)|
3. DIR :1 (S)|
4. [Press only the enter key]
5. LOAD ''
6. SAVE ''
7. TRON|
8. [Press the break key]

Note that the vertical bar character "|" (press clear, shift, and / simultaneously) makes the filter send a carriage-return character to the executing program, just as if you had pressed the enter key.

Step 1 creates a build file named YOURPF/FKF. Step 2 makes the F1 key display a directory of all drive-zero files. Step 3 makes the F2 key display a directory of drive 1, including system files. The build file assigns no command to F3, so nothing will happen when you press it.

Step 5 makes the command LOAD '' appear in Basic when you press shift-F1. Similarly, steps 6 and 7 invoke SAVE '' and Basic's Trace option when you press shift-F2 and shift-F3 respectively. Step 8 closes the build file.

If you want, you can enter several commands on a single line, separating them with vertical bars. Pressing the appropri-

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ate function key makes the commands execute in sequence.

You invoke this ASCII file in the Set command line; see line 280 of the Listing for the syntax.

New Assignments

Once you install PF/FLT, the special key combination clear/shift-Z lets you reprogram the shifted function keys. For example, press clear/shift-Z. The computer prompts "Key (shifted)?". Press shift-F1 and type in:

```
BACKUP /BAS:0 :1|
```

and press the enter key.

From now on, when you press shift-F1 from DOS Ready, TRSDOS backs up all drive-zero files with the extension /BAS to drive 1. The filter sends an enter character along with the Back-up command so the back-up executes immediately. You can assign the key a new function at any time by repeating the procedure above using a different command.

Similarly, if you wanted to use the shifted F3 key in Scripsit to return an ASCII character string to separate sections of a document, you'd press clear/shift-Z, press shift-F3, and type in:

```
|>C=Y|----=====O=====----|>C=N||.
```

The command includes Scripsit control codes to center the character string on the page.

Long and Short

PF/FLT uses fewer than 700 bytes of memory. If RAM is at a premium, you have the option of installing a shortened, 400-byte form by specifying P=N (program=no) as a parameter on the Set command line. In doing so, you sacrifice the filter's dynamic programming capability.

If you choose not to install PF/FLT on your disk using the SYSGEN command, you have the option of invoking the Set and Filter statements from a do-file. See your TRSDOS manual for instructions. You should be sure to load and insert PF/FLT into the keyboard driver only once. Loading it more than once can produce weird results. The DOS manual has more information about filters and phantom devices.

I use PF/FLT with my ScripAid Scripsit enhancements ("Model 4 Scripsit the Write Way," January 1985, p. 60), to invoke often-used editing commands, with my Assembly-language editor to create executable macro functions, and with spreadsheets to perform a series of replications or data format commands. I think you'll find it's a convenient addition to many of your applications.■

You can write to Clifford I. Knight at 6 Janebar Circle, P.O. Box 253, Manomet, MA 02345.

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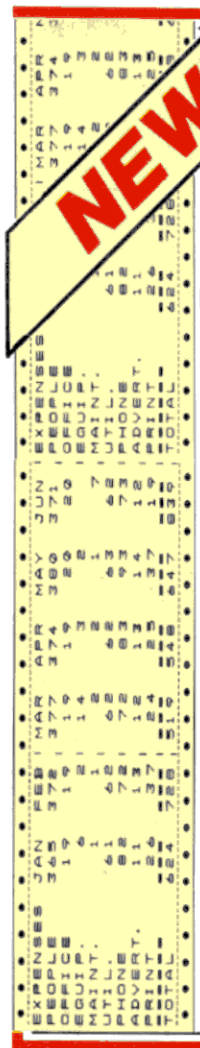

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Listing continued

```
00630 FEXT    EQU     4FH       ;ADD FILESPEC IF NEEDED
00640 OPEN    EQU     3BH       ;OPEN A FILE
00650 GET     EQU     03H       ;GET A BYTE FROM FCB OR DCB
00660 CLOSE   EQU     3CH       ;CLOSE A FILE
00670 KEY     EQU     01H       ;WAIT FOR A KEY
00680 DSP     EQU     02H       ;DISPLAY A BYTE
00690 PARAM   EQU     11H       ;PARSE A PARAMETER STRING
00700 VDCTL   EQU     0FH       ;VIDEO CONTROL
00710 VDBUFF  EQU     0420H     ;USE DOS *KI BUFFER AS STRG
00720 ;
00730 ;
00740         PSECT   2600H
00750 ;
00760 FCB1    DEFS    20H               ;32 BYTE FCB
00770 BUFFER  DEFS    100H              ;256 BYTE DISK I/O BUFF
00780 ;
00790 ENTRY   LD      (OLDSP),SP        ;SAVE STACK POINTER
00800         CALL    INITA             ;CK DEV SYNTAX & MEM
00810         CALL    INITF             ;GET CMD FILE (IF ANY)
00820         JR      NZ,NOBNNR         ;NZ= INPUT FILE
00830         LD      HL,KEYMSG         ;HL-> KEY DATA MSG
00840         CALL    DSPMSG            ;TO VIDEO
00850 NOBNNR  CALL    INITB             ;RELOCATE FILTER
00860         LD      HL,0000H          ;DO NOT ABORT JCL
00870         RET                       ;DONE
00880 ;
00890 ;
00900 INITA   PUSH    DE                ;TRANSFER DCB POINTER
00910         POP     IX                ;TO IX
00920         LD      (MODDCB),DE       ;LOAD DCB ADDR-> FILTER
00930         PUSH    HL                ;SAVE CMD LINE PTR
00940         LD      HL,BANNER         ;HL-> SIGN ON BANNER
00950         CALL    DSPMSG            ;TO VIDEO
00960         POP     HL                ;GET CMD LINE PTR
00970         LD      A,FLAGS           ;SVC, IY-> SYS FLAGS
00980         RST     28H               ;DO IT
00990         BIT     3,(IY+2)          ;@RUN FROM "SET" ?
01000         JP      Z,NOTSET          ;ERROR
01010         BIT     0,(IY+2)          ;HIGH$ PROTECTED ?
01020         JP      NZ,NOMEM          ;NZ= NO MEMORY
01030         LD      DE,PRMTBL         ;DE-> PARAMETER TABLE
01040         LD      A,PARAM           ;@PARAM SVC
01050         RST     28H
01060         JP      NZ,PRMERR         ;NZ=ERROR
01070         RET                       ;ELSE OK
01080 ;
01090 ;
01100 INITB   LD      (IX+0),41H        ;FILTER,GET ONLY
01110         LD      HL,0000H          ;SET "GET" MODE
01120         LD      B,L               ;SET "HIGH$"
01130         LD      A,HIGH            ;SVC, GET HIGH$
01140         RST     28H               ;DO IT
01150         LD      (OLDMEM),HL       ;SET LAST BYTE PTR
01160         LD      BC,0FFFFH         ;"PROG" FLAG FROM PARAM
01170 PRGFLG  EQU     $-2
01180         LD      A,B               ;GET MSB FLAG
01190         OR      C                 ;MERGE LSB
01200         JR      NZ,MOVFLT         ;NZ= "PROG" MODE
01210         LD      HL,(LSTPTR)       ;GET END OF FLT
01220         LD      BC,F1             ;BC-> 1ST USER/DEF
01230         PUSH    BC                ;SAVE IT
01240         OR      A
01250         SBC     HL,BC             ;HL=LEN OF USR/DEF
01260         PUSH    HL                ;SAVE LENGTH
01270         POP     BC                ;BC=LENGTH
01280         LD      DE,NOPROG         ;DE=MOVE TO LOC
01290         POP     HL                ;HL-> SOURCE
01300         LDIR                      ;MOVE FILE
01310         LD      (LSTPTR),DE       ;SAVE NEW END
01320         OR      A
01330         SBC     HL,DE             ;HL=OFFSET
01340         EX      DE,HL             ;DE=OFFSET
01350         PUSH    IX                ;SAVE IX
01360         LD      IX,VECTAB         ;IX-> VECTOR TABLE
01370         LD      B,06H             ;6 VECTORS TO FIX
01380 FIXLP   LD      L,(IX+0)          ;GET LSB
01390         LD      H,(IX+1)          ;HL=VECTOR
01400         OR      A
01410         SBC     HL,DE             ;FIX VECTOR
01420         LD      (IX+0),L
01430         LD      (IX+1),H          ;SAVE FIXED VECTOR
01440         INC     IX
01450         INC     IX                ;IX-> NEXT VECTOR
01460         DJNZ    FIXLP             ;FIX SIX
01470         POP     IX                ;RESTORE IX
01480         LD      HL,0000H          ;2 NOP'S
01490         LD      (GETJMP),HL       ;RESET "GET INP" JMP
01500         LD      (LSTREL),HL       ;BLOCK END OF RELS
01510 ;
01520 ;
01530 MOVFLT  CALL    INITC             ;SET DEFVECS
01540         LD      HL,LAST           ;HL-> END OF FLT
01550 LSTPTR  EQU     $-2
01560         LD      BC,FENTRY         ;BC-> FLT ENTRY
01570         PUSH    BC                ;SAVE IT
01580         OR      A
01590         SBC     HL,BC             ;HL=LENGTH
01600         EX      (SP),HL           ;HL=FENTRY
01610         POP     BC                ;BC=LENGTH
01620         PUSH    BC
01630         PUSH    HL
```

Listing continued on p. 116

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QUALITY DISK DRIVES

These drives are complete with power supply, cover and external drive connector. For TRS-80 Model I, III, 4, IBM PC and others. All drives are Double Density and step at 6ms or less. SS means single head, DS is double head. Specify white or silver color cover for no additional charge or my beautiful new Stainless Steel cover for only $9 additional. Add $5 per drive shipping unless otherwise specified. All drives have a one year warranty on parts and labor. Bare drives, that is, just the drives themselves are also available for those of you who don't need or want one of my power supplies.

COMPLETE 3.5" - 5.25" - 8" DISK DRIVES

1ea. 40tk DS TEAC FD-35B in a dual case	157
2ea. 40tk DS TEAC FD-35B in a dual case	255
1ea. 80tk DS TEAC FD-35F in a dual case	177
2ea. 80tk DS TEAC FD-35F in a dual case	285
40tk SS Tandon TM100-1	$ 147
40tk DS Tandon TM100-2	157
1ea. 40tk SS TEAC FD-55A in dual case	$ 127
2ea. 40tk SS TEAC FD-55A in dual case	217
1ea. 40tk DS TEAC FD-55B in dual case	137
2ea. 40tk DS TEAC FD-55B in dual case	257
1ea. 80tk DS TEAC FD-55F in dual case	157
2ea. 80tk DS TEAC FD-55F in dual case	277

Add $10 S & H per case for these 8" drives.

2ea. SS TM848-1E's in dual case with fan	$ 647
2ea. DS TM848-2E's in dual case with fan	697

BARE 5.25" & 8" DISK DRIVES

Add $4 shipping per drive.

40tk SS, Full Size, Tandon TM100-1	$ 99
40tk DS, Full Size, Tandon TM100-2	119
40tk SS, Half-High, TEAC FD55-A	99
40tk DS, Half-High, TEAC FD55-B	109
80tk DS, Half-High, TEAC FD55-F	129
8" SS, Thinline, Tandon TM848-1E	259
8" DS, Thinline, Tandon TM848-2E	333

TRS-80 MODEL III/4 DISK DRIVE KITS

Add $8 shipping per kit.

Internal drive kit complete with disk controller, power supply, mounting brackets, cables and all hardware plus step-by-step instructions. This kit contains everything you need (except the Disk Operating System, drive and a screwdriver) to convert your cassette Model III or 4 to fast reliable disk operation. Don't confuse this quality kit with the high-priced ripoffs. Thousands of satisfied customers cannot be wrong. You can join them for only ..... $ 189
Same as above but with 1-40tk SS drive 289
Same as above but with 2-40tk SS drives 388

TRS-80 MODEL I DOUBLE DENSITY CONTROLLERS

Add $3 shipping.

Aerocomp "DDC" Really the best by test	$ 99
Aerocomp "DDC" with LDOS	159
Aerocomp "DDC" with NEWDOS 80-v2.0	179

OTHER DRIVE GOODIES

Add $2 shipping.

TRSDOS 1.3 Disk & Manual for Model III	$ 24
TRSDOS 2.3 Disk & Manual for Model I	24
TRSDOS 6.x Disk & Manual for Model 4	34
LDOS for the Model I or III	69
NEWDOS 80 v2.0 for the Model I or III	99
2-drive cable for Model I/III/4	24
2-drive external cable for IBM PC	40
4-drive cable for Model I	34
Extender cable, 7" long	9
5.25" power supply & encl., white or silver	59
Sainless Steel Covers	12
8" power supply, fan & enclosure, beige	149

ROSE GETS RIGHT!
NOW---ROSE'S MOD 4 CP/M
$ 69

Complete with Manual

Rose has latched onto this slick version of CP/M 2.2 that allows you to run most of your favorite CP/M programs with ease. It even lets you read and write other manufacturers' disk formats. What could be nicer? They are in stock ready for you to use and enjoy.

TRS-80 SPECIAL EQUIPMENT

12" Green Comp. Monitor. Add $10 for TTL	89
12" Amber Comp. Monitor. Add $10 for TTL	84
16K 200 nsec RAM Guaranteed 1 year(8 chips)	9
64K 200 nsec RAM Guaranteed 1 year(8 chips)	19
64K RAM plus Genuine PAL for Model 4	29
256K 150 nsec RAM 1 yr guarantee (8 chips)	39

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5" Diskettes SSDD, Lifetime Guarantee. 10pk	$ 16
5" Diskettes DSDD, Lifetime Guarantee. 10pk	19
5" Flipsort, holds 75 Diskettes	16
8" Diskettes SSDD, Lifetime Guarantee. 10pk	24
8" Disketted DSDD, Lifetime Guarantee. 10pk	29
8" Flipsort, holds 50 Diskettes	22
5.25" or 8" Head Cleaning Kit	9
Letter Size 20 lb. Tractor Paper, 2900 sheets	25

SPECIAL SOFTWARE DEALS

Add $4 shipping.

WordStar® 3.3 (Specify MM or R/S format)	$ 195
MailMerg®, SpellStar®, Starindex®, all 3 for just	99
WordStar Professional (Above 4 Progams)	275
DataStar® Data Entry & Retrieval	125
ReportStar® Report Generator	105
InfoStar® Advanced DBMS (Above 2 Programs)	195
dBASE II® Complete With Disk Tutorial	345
Super Utility Plus 3.2 by Kim Watt	59
CP/M 2.2 for Model 4 by Monte Zuma	169
Turbo PASCAL by Bor Land. Requires CP/M	44
Turbo Toolbox by Bor Land	45
Turbo TUTOR by Bor Land	35
Pickles & Trout CP/M 2.2m for the Model 2-12-16. Floppy Version	179
Same thing but the Radio Shack Hard Disk	219

CP/M & 80 COLUMN for your MODEL III

No need to buy a new computer when you can use the Holmes VID-80 modification and get CP/M 2.2, 64K RAM and 80 column video. This kit is easy to install and requires no soldering. Even a dolt like you can can end up with a complete 64K CP/M computer with an 80 column screen that is still able to run all your existing Model III software. For the first time you will be able to use CP/M programs that normal people do, such as dBASE II and WordStar. The regular price of this kit is $524. Now Rose will get you going for only ..... Add $5 shipping ... **$ 299**

I'll ship you the Holmes deal above PLUS WordStar 3.3 installed, complete with original manuals ready to run for only .... **$ 399**

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Orders Only Please

Call in your order or write to us at the address below. Texas residents call us at 214-337-4346 and deduct $2.00 from your order but you should remind me 'cause sometimes I forget. If you need technical information or service please call the Texas number as the Toll Free lines are just for orders only. Prices are subject to change without notice and are mail order only. I accept AMERICAN EXPRESS, MASTERCARD and VISA and I will not charge your card until I ship your goodies. You can send a check or a money order. I also accept COD orders but they require cash or a cashier's check upon delivery. If shipping charges are not shown please call for the correct amount. Add $5.00 handling charge if your order is less than $50.00. Shipping charges quoted in this ad are for the lower 48 states only. Orders to Canadian address add $20.00 to pay for doing all those papers for customs. Texans add State Sales tax. No tax collected on shipments outside of Texas. Be sure you know what you are buying. SOFTWARE IS SOLD ON A REPLACEMENT BASIS ONLY - NO REFUNDS. If it is defective call us for instructions. Please order from me now---I need the money and I will not jack you around. I reserve the right to charge up to a ten percent restocking charge if you jack me around. All merchandise carries the original manufacturers' warranty and all repairs or adjustments will be made by the manufacturer or his designated representative.

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Comes complete with cable and choice of software driver* (CPM, LDOS, TRSDOS)

10 Megabyte Hard Drive	$899
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SYSTEM FEATURES

- For TRS-80 Model 3-4-4P
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- Size Rated After Format
- Continuous Duty Power Supply
- Error Checking & Correcting
- Continuous Duty Fan
- Size 11.5" x 12.5" x 5.0"
- All Contacts Gold Plated

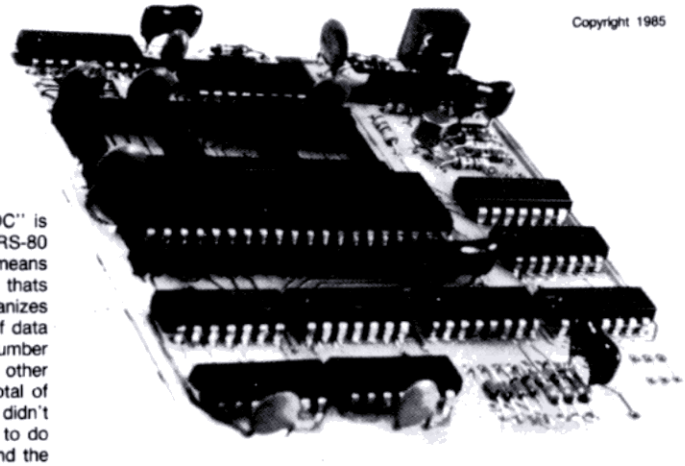
*Model 3 requires LDOS
Model 4 requires TRSDOS 6.2 or Montezuma Micro CP/M 2.2

There are firms which offer benefits, experience or products seemingly too good to be true. Now why would you want to expose yourself to unhappiness when Aerocomp has a proven record of thousands of happy, satisfied TRS-80 customers. Just take a minute to look through back issues of this magazine. You won't find many companies that have been around as long as Aerocomp. We fully support TRS-80 computers and most all operating systems including CP/M 2.2. Aerocomp leads the way to low hard disk prices so you can afford to enjoy the benefits of increased storage and faster disk I/O. These units are precision engineered, tested and delivered complete and ready to use, right from our stock. Each unit is guaranteed for one year parts and labor. You can count on us to be here if you should ever need us. As always, your satisfaction is assured with our 14 day free trial offer. If, for some reason, you are dissatified with our drive merely return it for a full refund (less shipping). How can you go wrong? Specify the software driver of your choice and start enjoying your computer's real capability. Do it today! Call our toll-free number now!

See opposite page ▶▶▶▶▶▶

MODEL I DOUBLE DENSITY BOARD

Add 80% more capacity to your disk system with the Double Density Controller (DDC) from Aerocomp.



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The Story

Some products have what it takes to seem to last forever. Our "DDC" is one of those products. What it does is allow you to operate your TRS-80 Model 1 disk system in double density. In this case double density means almost doubling the storage capacity of your diskettes. Single density, thats the way Radio Shack designed your Model I expansion interface, organizes your disk into 10 sectors per track. Each sector contains 256 bytes of data for a total storage capacity of 2,560 bytes or 2.5K per track times the number of tracks your drive is capable of adressing. Double density, on the other hand, writes 18 sectors per track each containing 256 bytes for a total of 4,608 bytes or 4.5K. That is 80% more data in the same space. Why didn't Radio Shack do that in the beginning, you ask? Well it costs money to do double density because it is more difficult to do than single density and the data is harder to capture reliably. That means more cost and the Model I was meant to be a low-cost computer for the masses. Therefore, no double density for the original Model I.

The Facts

Other companies introduced double density controllers for the Model I but they were not so good. We waited and waited but, even new models failed to correct problems with data separation that kept cropping up. So we went to work and came up with a new design to cure the old problem. At last! A double density controller for the Model I with a higher probability of data recovery than with any other double density controller on the market then or since. Our analog design phase lock loop data separator has a wider capture window than the digital types the others use. This allows high resolution data centering. Our "DDC" analog circuit allows infinately variable tuning. The attack and settling times are optimum for 5.25" diskettes. The oft-stated fears of adjustment problems rumored by digital dilettantes have been proved groundless by thousands of satisfied users the world over. The bottom line here is state-of-the-art performance and reliability.

ORDER YOURS TODAY

TRS-80 Model I disk system owners who are ready for reliable double density operation will get 80% more storage per diskette; single and double density data separation with far fewer disk I/O errors; single density compatibility; simple plug-in operation. You will need a disk operating system that has the necessary double density software. All the popular DOS's (except TRSDOS) have the drivers. We have put together two special packages in the event you don't already have one of the more popular DOS's.

Please add $4 handling & shipping

"DDC" by itself	$ 99
"DDC" and LDOS	159
"DDC" and NEWDOS 80 2.0	179

☞40 Track
☞80 Track
☞Single Head
☞Dual Head
☞Bare
☞Complete
☞Full Size
☞Half Size
☞3-1/2", 5-1/4" or 8"

DISK DRIVES

Aerocomp leads the way to the BEST value in disk drives and related peripheral products on the market today. Sound engineering, high performance, quality construction, no-risk free trial, outstanding warranty service and a reputation for doing the right thing make your decision to buy Aerocomp the correct one. Please look over our offerings and make your selection. When you have made your choice call our toll-free number and place your order. If you need assistance in making your selection, please call our information number. It's listed in the box at the bottom of this ad along with the technical assistance number for those of you who want to get right to the nitty-gritty. Thanks, we all appreciate your business and will continue to do our very best to support you.

BARE DRIVES Add $4 S&H

These drives are completely burned-in and tested for your ultimate satisfaction. Add that extra drive today! These are new factory drives. No blems, seconds, closeouts or defunct manufacturers surplus (MPI, Shugart, etc). Instruction manual included at no extra cost. Service manuals are also available. See "Miscellaneous Goodies" for information.

40tk SS half high TEAC FD35-A	$ 99
40tk DS half high TEAC FD35-B	109
80tk DS half high TEAC FD35-F	129
40tk SS full size Tandon TM100-1	119
40tk DS full size Tandon TM100-2	119
40tk SS half high TEAC FD55-A	89
40tk DS half high TEAC FD55-B	99
80tk DS half high TEAC FD55-F	119
8" SS Thinline Tandon TM848-1E	260
8" DS Thinline Tandon TM848-2E	335

8" FLOPPY DRIVES Add $12 S&H

These 8" Thinline drives work with the Model 2 and 16 plus others that use standard drives. The rugged all-steel cabinet has an extra heavy duty power supply rated for continuous operation. A removeable air filter allows only clean air to circulate. Cabinets with single drives are supplied with a blank panel to cover the unused space. A second drive can be added at any time. Service manuals are available. See "Miscellaneous Goodies" for info.

1-8" SS Tandon TM848-1E & case	$ 389
2-8" SS Tandon TM848-1E's & case	649
1-8" DS Tandon TM848-1E & case	439
2-8" DS Tandon TM848-2E's & case	699

MISCELLANEOUS GOODIES $2 S&H

Model 1 TRSDOS 2.3 disk & manual	$ 25
Model 3 TRSDOS 1.3 disk & manual	25
Model 4 TRSDOS 6.2.x disk & manual	20
LDOS (specify Model I or III)	69
NEWDOS 80 v2.0 (specify Model I or III)	99
Montezuma Micro Model 4 CP/M 2.2	169
Tandon TM100-1/2 Service Manual	20
Tandon TM848-1/2 Service Manual	20
TEAC FD55A/B/F Service Manual	20
10 SSDD disks in library box, Lifetime Guar	12
10 DSDD disks in library box, Lifetime Guar	15
5.25" drive power supply & enclosure	59
8" drive pwr sply & encl w/fan 5V-24V	150
5.25" 1-drive cable, a nice length	19
5.25" 2-drive cable, a 44 incher	24
5.25" 3-drive cable, just the right size	29
5.25" 4-drive cable, the top dog	34
5.25" Extender cable with gold contacts	10

COMPLETE DRIVES Add $6 S&H

Fits TRS-80 Models 1,3,4 and the Color Computer plus the others that use standard drives. The drive of your choice is mounted in a sturdy, all-steel cabinet. An external gold plated drive connector allows cabling without disassembly of the cabinet. Half-high drives come in a full-size cabinet that will hold and power our half-high drives. Single drives have a panel covering the unused space allowing a second drive to be added at any time. All are shipped fully assembled ready to use. Specify silver or beige cover. Stainless Steel covers are available for $12 additional.

1-40tk DS 3.5" FD-35B in dual case	$ 159
2-40tk DS 3.5" FD-35B's in dual case	259
1-80tk DS 3.5" FD-35F in dual case	179
2-80tk DS 3.5" FD-35F's in dual case	289
40tk Single Side full size TM100-1	149
40tk Double Side full size TM100-2	159
1-40tk SS half-high FD-55A in dual case	129
2-40tk SS half-high FD-55A's in dual case	219
1-40tk DS half-high FD-55B in dual case	139
2-40tk DS half-high FD-55B's in dual case	259
1-80tk DS half-high FD-55F in dual case	159
2-80tk DS half-high FD-55F's in dual case	279

FREE TRIAL OFFER

Use your Aerocomp hardware product for up to 14 days. If you are not satisfied for **ANY REASON** (except misuse, damage or improper handling), return it (insured) in the original shipping container for a full purchase price refund, less shipping. **Sorry, this offer does not apply to software. Defective software will be replaced.** Any hardware/software specials will be prorated and the software will be charged at the regular unbundled price. We have confidence in our products and we know you will be satisfied.

WARRANTY

We offer a one year warranty on parts and labor against defects in materials and workmanship. In the event service becomes necessary for any reason you will find our service department fast, friendly and cooperative. We want to keep you happy. Out of warranty repairs are also available.

100% BURN-IN and TEST

All our products are burned-in and fully tested prior to shipment. We want you to receive an item ready-to-go. AEROCOMP means reliability!

ORDER NOW!

Call our toll-free number service and place your order. Have your American Express, Mastercharge or Visa number ready. We will not charge your card until the day we ship your order. You may order by mail using your credit card, check or money order. Personal and company checks are welcome and cause no shipping delay as long as they are bank printed and the signature exactly agrees with the name printed on the check. We will ship surface COD with no deposit but all COD's require cash or a cashier's check on delivery. Texas residents add 6% State Sales Tax. No tax collected on out of state shipments. Canadian addresses add $20 to your order if over $550 for customs documentation.

TRS-80 Model III & 4 DISK CONTROLLER and DRIVE KITS

Convert your cassette Model III or 4 to disk operation with one of our complete kits. You receive our own advanced disk controller board with gold plated edge contacts capable of 4-drive operation; our own power supply; plated steel mounting towers complete with RFI shield plus all the cables and hardware necessary. Detailed instructions are included. All you need is a screwdriver and a pair of pliers. System kits come with 40 track single-side drives or just order the basic kit and pick the drives you want from the selection in the next column.

CONTROLLER KIT (Everything you need - less drives and DOS)	**$ 199**
1 DRIVE SYSTEM	**299**
2 DRIVE SYSTEM	**399**
Substitute DS drives for only $10 each	
Add $9 shipping & handling	
Model 3 TRSDOS 1.3 disk/manual	25
Model 4 TRSDOS 6.2.x disk/manual	20
LDOS 5.1.4disk/manual	69
NEWDOS 80 version 2.0disk/manual	99
CP/M 2.2 by Montezuma Micro	169
No S & H charge when ordered with kit	
MOUNTING KIT AND POWER SUPPLY ONLY	**95**
Add $8 shipping and handling	
DISK CONTROLLER ONLY	**110**
RS-232 BOARD & KIT	**69**
Add $4 shipping and handling	

OUR FAMOUS MODEL I STARTER PACKAGE

If you have a Model I and an Expansion Interface this is what you need to get started with disks. Included is one 40 track single-side disk drive complete with matching silver case and power supply, a 2-drive cable, a TRSDOS 2.3 disk operating system and TRSDOS manual plus all insurance and delivery charges to your door (lower 48 states).

Yours for only **$ 199**

LDOS 5.1.4 disk/manual	69
NEWDOS 80 version 2.0disk/manual	99

You can add our renowned "DDC" double density controller to either the Radio Shack or the LNW Expansion Interface for 80% more storage capacity on your drive. Order it at the same time as our starter package above and we'll pay the shipping. Go ahead, you deserve increased density. See the opposite page for the latest technical details.

$ 89
When purchased with Starter Package

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by James W. Wood

Next-Generation Software

Re-create the agricultural experiments Gregor Mendel conducted in developing his theory of genetics.

Modern-day genetic theory involves complex issues like selective breeding and genetic control. But this theory has its basis in Gregor Mendel's simple, 19th-century experiments with garden peas. I wrote a Basic program, Traits (see the Program Listing), that re-creates Mendel's experiments to demonstrate the tenets of genetics. Traits determines the genetic and physical makeup of an organism based on its parents' characteristics. It calculates the result of crossing different parents and takes into account dominant and recessive traits.

Like Mendel, I used garden peas to illustrate genetic principles. Traits lets you input genes for both male and female parent seeds and displays all possible offspring for hybrid, dihybrid, and trihybrid crosses in a Punnett Square (see Figs. 1–4). The program lets you choose one of the above three crosses and gives you the option to continue experimenting after each calculation. In addition to the completed Punnett Square, you're given the genotypic (genetic makeup) and phenotypic (physical characteristics) ratios for each cross.

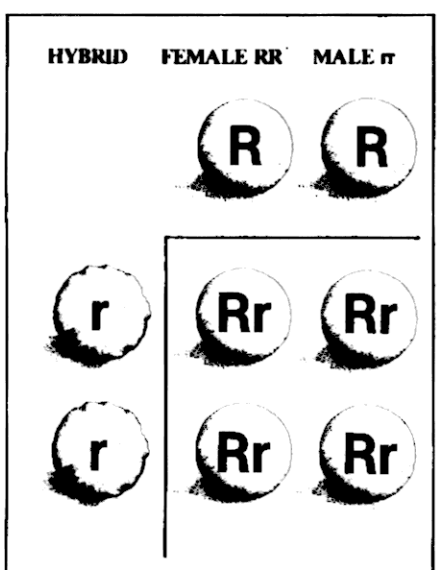

Figure 1. Punnett Square for hybrid cross.

Round and Wrinkled Peas

When Mendel crossed round peas with wrinkled ones, the offspring were round; when he crossed yellow peas with green peas, the offspring were yellow. Based on these results, Mendel deduced that round and yellow characteristics are dominant traits, wrinkled and green recessive traits.

When Mendel planted the first-generation round seeds, they produced both round and wrinkled seeds. Likewise, the fertilized yellow peas produced both yellow and green seeds. The traits that seemed to have disappeared in the first cross reappeared in the second generation. Dominant and recessive traits are deceiving because the genetic makeups of two organisms are sometimes different, while phenotypically, the two are indistinguishable.

Mendel used "R" to symbolize the dominant round trait and "r" for the recessive wrinkled trait. The first cross of a pure RR seed with a pure rr seed is illustrated in Fig. 1. The RR seed provides R gametes only, reproductive cells with one set of chromosomes. All four offspring have round and wrinkled genes, but because round is dominant, the peas appear round. When you cross the offspring, the parental egg and pollen are both genotypically Rr, providing either an R or an r gamete (see Fig. 2). The phenotype ratio is 3:1 because three of the seeds appear round while one is wrinkled. The genotype ratio, the ratio of actual gene types, is 1:2:1 (RR:Rr:rr).

LOAD 80

System Requirements

Models I, III, 4, 1000, 1200
16K RAM Cassette Basic
32K RAM Disk Basic
Printer optional

Dihybrid and Trihybrid Crosses

A dihybrid cross involves the study of two characteristics simultaneously. Consider, for example, round and wrinkled, and yellow and green peas (use R for round, r for wrinkled, Y for yellow, and y for green). The Punnett Square for an RrYy egg and RrYy pollen cross is shown in Fig. 3. RrYy produces four possible gametes: RY, Ry, rY, and ry. Nine of these offspring are round and yellow, three are round and green, three are wrinkled and yellow, and one is wrinkled and green. The resulting phenotype is 9:3:3:1.

To find the genotype, my program calculates the number of direct matches among genes by vertically examining each row of the Punnett Square. The genotype ratio for the dihybrid is 1:2:2:4:1:2:1:2:1, which translates to RRYY:RRYy:RrYY:RrYy:RRyy:Rryy:rrYY:rrYy:rryy.

You also have the option of calculating

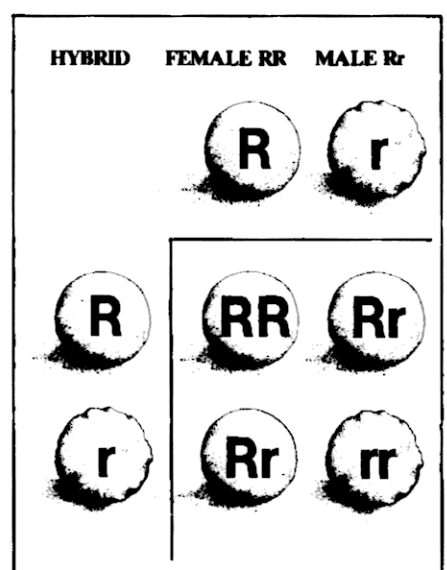

Figure 2. Second generation of hybrid cross in Fig. 1.

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by Christopher Fara

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trihybrid crosses (see Fig. 4), though you'll have to wait longer for the results.

Using Traits

After deciding what type of cross you want to solve, type in the egg and pollen genes: two genes for a hybrid cross, four for a dihybrid cross, and six for a trihybrid cross. Don't use the enter key once the program starts running. To enter lowercase letters, use the shift key and then type in the letter. Don't use shift-0 to change from uppercase to lowercase.

The program lets you experiment with various eggs and pollen, though it doesn't check for invalid entries. If you cross AaBb with AaCc, Traits does the calculations although the results are meaningless. The Table describes Traits' routines. Figure 5 shows modifications for the Models 4, 1000, and 1200.■

Contact James W. Wood at 424 N. Missouri, Atwood, IL 61913.

Related Article

Rauber, Albert, M.D. "Genotype," October 1980, p. 188. Genetic counsel from your Model I.

DIHYBRID FEMALE RrYy MALE RrYy

.	RY	Ry	rY	ry
RY .	RRYY	RRYy	RrYY	RrYy
Ry .	RRYy	RRyy	RrYy	Rryy
rY .	RrYY	RrYy	rrYY	rrYy
ry .	RrYy	Rryy	rrYy	rryy

PHENOTYPE RATIO 9 : 3 : 3 : 1
GENOTYPE RATIO 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1 :

Figure 3. Punnett Square for dihybrid cross.

TRIHYBRID FEMALE AaBbCc MALE AaBbCc

.	ABC	ABc	AbC	Abc	aBC	aBc	abC	abc
ABC .	AABBCC	AABBCc	AABbCC	AABbCc	AaBBCC	AaBBCc	AaBbCC	AaBbCc
ABc .	AABBCc	AABBcc	AABbCc	AABbcc	AaBBCc	AaBBcc	AaBbCc	AaBbcc
AbC .	AABbCC	AABbCc	AAbbCC	AAbbCc	AaBbCC	AaBbCc	AabbCC	AabbCc
Abc .	AABbCc	AABbcc	AAbbCc	AAbbcc	AaBbCc	AaBbcc	AabbCc	Aabbcc
aBC .	AaBBCC	AaBBCc	AaBbCC	AaBbCc	aaBBCC	aaBBCc	aaBbCC	aaBbCc
aBc .	AaBBCc	AaBBcc	AaBbCc	AaBbcc	aaBBCc	aaBBcc	aaBbCc	aaBbcc
abC .	AaBbCC	AaBbCc	AabbCC	AabbCc	aaBbCC	aaBbCc	aabbCC	aabbCc
abc .	AaBbCc	AaBbcc	AabbCc	Aabbcc	aaBbCc	aaBbcc	aabbCc	aabbcc

PHENOTYPE RATIO 27 : 9 : 9 : 3 : 9 : 3 : 3 : 1
GENOTYPE RATIO 1 : 2 : 2 : 4 : 2 : 4 : 4 : 8 : 1 : 2 : 2 : 4 :
1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1 :
TYPE 'R' TO RUN AGAIN

Figure 4. Punnett Square for trihybrid cross.

```
20 CLS:DIM A$(65),E$(64)
550 FOR A=B TO 17
560 IF E$(B)="Z" THEN IF A>15 AND B>15 THEN 610 ELSE 600
1090 FOR A=B TO 65
1100 IF E$(B)="Z" THEN IF A>63 AND B>63 THEN 1150 ELSE 1140
Change the following lines to PRINT
Lines 160, 170, 430, 440, 930, 940
```

Figure 5. Modifications for the Models 4, 1000, and 1200.

	Line numbers		Definition
Hybrid	**Dihybrid**	**Trihybrid**	
	230–300	640–790	Figures gametes.
70	310–360	800–850	Arranges genes of offspring.
	370–400	860–900	Prevents lowercase letters from preceding uppercase letters.
130–190	410–440	910–940	Prints Punnett Square.
80–120	450–600	950–1140	Calculates phenotype and genotype ratios.

Table. Traits' line descriptions.

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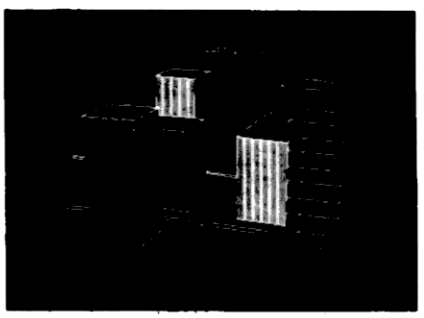

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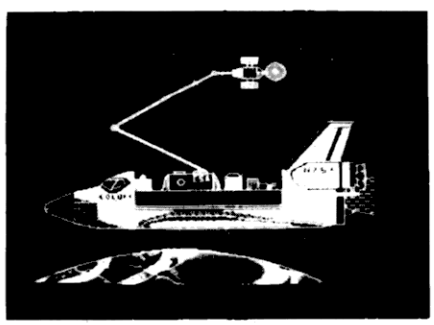

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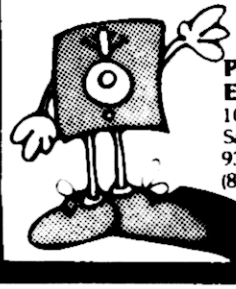

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Program Listing. Traits.

```
10 REM JAMES W. WOOD, 424 N. MISSOURI, ATWOOD, IL, 61913
20 CLS:CLEAR 500:DIM A$(64),E$(64)
30 PRINT "TYPE '1' FOR HYBRID,   '2' FOR DIHYBRID,    '3' FOR TRIHYBRID"
40 Q$=INKEY$:IF Q$="1" THEN 50 ELSE IF Q$="2" THEN 210 ELSE IF Q$="3" THEN 620 E
LSE 40
50 CLS:WW=2:GOSUB 1180
60 CLS:PRINT "HYBRID          FEMALE ";A$;"          MALE ";B$:PRINT:PRINT
70 A$(1)=LEFT$(B$,1)+LEFT$(A$,1):A$(3)=LEFT$(A$,1)+RIGHT$(B$,1):A$(2)=LEFT$(B$,1
)+RIGHT$(A$,1):A$(4)=RIGHT$(B$,1)+RIGHT$(A$,1)
80 FOR A=1 TO 4:IF ASC(LEFT$(A$(A),1))>91 THEN A$(A)=RIGHT$(A$(A),1)+LEFT$(A$(A)
,1)
90 IF ASC(LEFT$(A$(A),1))<91 AND ASC(RIGHT$(A$(A),1))<91 THEN N=N+1
100 IF ASC(LEFT$(A$(A),1))<91 AND ASC(RIGHT$(A$(A),1))>91 THEN O=O+1
110 IF ASC(LEFT$(A$(A),1))>91 AND ASC(RIGHT$(A$(A),1))>91 THEN P=P+1
120 NEXT A
130 PRINT " ",LEFT$(A$,1),RIGHT$(A$,1):PRINT
140 PRINT LEFT$(B$,1),A$(1),A$(2)
150 PRINT RIGHT$(B$,1),A$(3),A$(4)
160 FOR X=0 TO 7:SET(X,13):NEXT X
170 FOR Y=10 TO 19:SET(5,Y):NEXT Y
180 PRINT "GENOTYPE RATIO";N;":";O;":";P
190 PRINT "PHENOTYPE RATIO";N+O;":";P
200 GOTO 1150
210 CLS:WW=4:GOSUB 1180
220 CLS:PRINT "DIHYBRID          FEMALE ";A$;"          MALE ";B$:PRINT:PRINT
230 B$(1)=MID$(A$,1,1)+MID$(A$,3,1)
240 B$(2)=MID$(A$,1,1)+MID$(A$,4,1)
250 B$(3)=MID$(A$,2,1)+MID$(A$,3,1)
260 B$(4)=MID$(A$,2,1)+MID$(A$,4,1)
270 C$(1)=MID$(B$,1,1)+MID$(B$,3,1)
280 C$(2)=MID$(B$,1,1)+MID$(B$,4,1)
290 C$(3)=MID$(B$,2,1)+MID$(B$,3,1)
300 C$(4)=MID$(B$,2,1)+MID$(B$,4,1)
310 FOR A=1 TO 16
320 G=A
330 IF G<5 THEN 340 ELSE G=G-4:GOTO 330
340 H=INT((A+3.1)/4)
350 A$(A)=MID$(B$(G),1,1)+MID$(C$(H),1,1)+MID$(B$(G),2,1)+MID$(C$(H),2,1)
360 NEXT A
370 FOR A=1 TO 16
380 IF ASC(MID$(A$(A),1,1))>91 THEN A$(A)=MID$(A$(A),2,1)+MID$(A$(A),1,1)+MID$(A
$(A),3,2)
390 IF ASC(MID$(A$(A),3,1))>91 THEN A$(A)=MID$(A$(A),1,2)+MID$(A$(A),4,1)+MID$(A
$(A),3,1)
400 NEXT A
410 PRINT " ",:FOR A=1 TO 4:PRINT B$(A)+"      ";:NEXT A:PRINT:PRINT
420 FOR A=1 TO 4:PRINT C$(A),:FOR B=1 TO 4:PRINT A$(B+(A-1)*4)+"    ";:NEXT B:PR
INT:NEXT A
430 FOR X=0 TO 90:SET(X,12):NEXT X
440 FOR Y=9 TO 25:SET(6,Y):NEXT Y
450 FOR A=1 TO 16
460 IF ASC(MID$(A$(A),1,1))<91 AND ASC(MID$(A$(A),3,1))<91 THEN N=N+1
470 IF ASC(MID$(A$(A),1,1))>91 AND ASC(MID$(A$(A),3,1))<91 THEN O=O+1
480 IF ASC(MID$(A$(A),1,1))<91 AND ASC(MID$(A$(A),3,1))>91 THEN P=P+1
490 IF ASC(MID$(A$(A),1,1))>91 AND ASC(MID$(A$(A),3,1))>91 THEN Q=Q+1
500 NEXT A
510 PRINT:PRINT "PHENOTYPE RATIO ";N;":";O;":";P;":";Q
520 PRINT "GENOTYPE RATIO ";
530 FOR B=1 TO 16
540 Z=1
550 FOR A=B TO 16
560 IF E$(B)="Z" THEN IF A>15 AND B>15 THEN 610 ELSE NEXT B
570 IF A<>B AND A$(B)=A$(A) THEN Z=Z+1:E$(A)="Z"
580 NEXT A
590 PRINT Z;":";
600 NEXT B
610 GOTO 1150
620 CLS:WW=6:GOSUB 1180
630 CLS:PRINT "TRIHYBRID          FEMALE ";A$;"          MALE ";B$
640 B$(1)=MID$(A$,1,1)+MID$(A$,3,1)+MID$(A$,5,1)
650 B$(2)=MID$(A$,1,1)+MID$(A$,3,1)+MID$(A$,6,1)
660 B$(3)=MID$(A$,1,1)+MID$(A$,4,1)+MID$(A$,5,1)
670 B$(4)=MID$(A$,1,1)+MID$(A$,4,1)+MID$(A$,6,1)
680 B$(5)=MID$(A$,2,1)+MID$(A$,3,1)+MID$(A$,5,1)
690 B$(6)=MID$(A$,2,1)+MID$(A$,3,1)+MID$(A$,6,1)
700 B$(7)=MID$(A$,2,1)+MID$(A$,4,1)+MID$(A$,5,1)
710 B$(8)=MID$(A$,2,1)+MID$(A$,4,1)+MID$(A$,6,1)
720 C$(1)=MID$(B$,1,1)+MID$(B$,3,1)+MID$(B$,5,1)
730 C$(2)=MID$(B$,1,1)+MID$(B$,3,1)+MID$(B$,6,1)
740 C$(3)=MID$(B$,1,1)+MID$(B$,4,1)+MID$(B$,5,1)
750 C$(4)=MID$(B$,1,1)+MID$(B$,4,1)+MID$(B$,6,1)
760 C$(5)=MID$(B$,2,1)+MID$(B$,3,1)+MID$(B$,5,1)
770 C$(6)=MID$(B$,2,1)+MID$(B$,3,1)+MID$(B$,6,1)
780 C$(7)=MID$(B$,2,1)+MID$(B$,4,1)+MID$(B$,5,1)
790 C$(8)=MID$(B$,2,1)+MID$(B$,4,1)+MID$(B$,6,1)
800 FOR A=1 TO 64
810 G=A
820 IF G<9 THEN 830 ELSE G=G-8:GOTO 820
830 H=INT((A+7.1)/8)
840 A$(A)=MID$(B$(G),1,1)+MID$(C$(H),1,1)+MID$(B$(G),2,1)+MID$(C$(H),2,1)+MID$(B
$(G),3,1)+MID$(C$(H),3,1)
850 NEXT A
860 FOR A=1 TO 64
870 IF ASC(MID$(A$(A),1,1))>91 THEN A$(A)=MID$(A$(A),2,1)+MID$(A$(A),1,1)+MID$(A
$(A),3,4)
880 IF ASC(MID$(A$(A),3,1))>91 THEN A$(A)=MID$(A$(A),1,2)+MID$(A$(A),4,1)+MID$(A
$(A),3,1)+MID$(A$(A),5,2)
890 IF ASC(MID$(A$(A),5,1))>91 THEN A$(A)=MID$(A$(A),1,4)+MID$(A$(A),6,1)+MID$(A
$(A),5,1)
900 NEXT A
910 PRINT "      ";:FOR A=1 TO 8:PRINT B$(A)+"    ";:NEXT A:PRINT:PRINT
920 FOR A=1 TO 8:PRINT C$(A)+"  ";:FOR B=1 TO 8:PRINT A$(B+(A-1)*8)+" ";:NEXT B:
```

Listing continued

Listing continued

```
PRINT:NEXT A
930 FOR X=1 TO 118:SET(X,7):NEXT X
940 FOR Y=4 TO 31:SET(8,Y):NEXT Y
950 FOR A=1 TO 64
960 IF ASC(MID$(A$(A),1,1))<91 AND ASC(MID$(A$(A),3,1))<91 AND ASC(MID$(A$(A),5,
1))<91 THEN N=N+1:GOTO 1040
970 IF ASC(MID$(A$(A),1,1))<91 AND ASC(MID$(A$(A),3,1))<91 AND ASC(MID$(A$(A),5,
1))>91 THEN O=O+1:GOTO 1040
980 IF ASC(MID$(A$(A),1,1))<91 AND ASC(MID$(A$(A),3,1))>91 AND ASC(MID$(A$(A),5,
1))<91 THEN P=P+1:GOTO 1040
990 IF ASC(MID$(A$(A),1,1))<91 AND ASC(MID$(A$(A),3,1))>91 AND ASC(MID$(A$(A),5,
1))>91 THEN Q=Q+1:GOTO 1040
1000 IF ASC(MID$(A$(A),1,1))>91 AND ASC(MID$(A$(A),3,1))<91 AND ASC(MID$(A$(A),5
,1))<91 THEN R=R+1:GOTO 1040
1010 IF ASC(MID$(A$(A),1,1))>91 AND ASC(MID$(A$(A),3,1))<91 AND ASC(MID$(A$(A),5
,1))>91 THEN S=S+1:GOTO 1040
1020 IF ASC(MID$(A$(A),1,1))>91 AND ASC(MID$(A$(A),3,1))>91 AND ASC(MID$(A$(A),5
,1))<91 THEN T=T+1:GOTO 1040
1030 IF ASC(MID$(A$(A),1,1))>91 AND ASC(MID$(A$(A),3,1))>91 AND ASC(MID$(A$(A),5
,1))>91 THEN U=U+1
1040 NEXT A
1050 PRINT "PHENOTYPE RATIO ";N;":";O;":";P;":";Q;":";R;":";S;":";T;":";U
1060 PRINT "GENOTYPE RATIO ";
1070 FOR B=1 TO 64
1080 Z=1
1090 FOR A=B TO 64
1100 IF E$(B)="Z" THEN IF A>63 AND B>63 THEN 1150 ELSE NEXT B
1110 IF A<>B AND A$(B)=A$(A) THEN Z=Z+1:E$(A)="Z"
1120 NEXT A
1130 PRINT Z;":";
1140 NEXT B
1150 PRINT:PRINT "TYPE 'R' TO RUN AGAIN";
1160 K$=INKEY$
1170 Q$=INKEY$:IF Q$="" THEN 1170 ELSE IF Q$="R" OR Q$="r" THEN RUN ELSE END
1180 FOR EE=1 TO 2
1190 M$=""
1200 IF EE=1 THEN PRINT "FEMALE" ELSE PRINT "MALE"
1210 FOR QQ=1 TO WW
1220 N$=INKEY$:IF N$="" THEN 1220
1230 IF PEEK(14464)<>0 THEN N$=CHR$(ASC(N$))
1240 M$=M$+N$
1250 PRINT N$;
1260 NEXT QQ:PRINT
1270 IF EE=1 THEN A$=M$ ELSE B$=M$
1280 NEXT EE:RETURN
```

End

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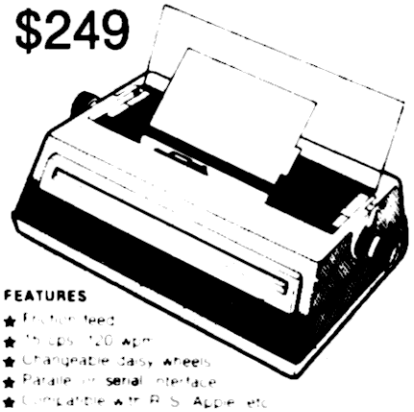

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Patch Maker

Take the hassle out of installing patches with your own build file.

One way to add personality to your DOS or applications programs is by customizing them with patches. But patches aren't simply implemented: They require a rigid, esoteric format and some of them can get pretty long. If you make an error while typing one into a Build file, you have to start all over again. My Model III patches management program, Patcher, takes the hassle out of installing patches. It lets you keep a library of patches on disk, then, with just a few keystrokes, select and transfer just the ones you need to another disk and create a Build file ready for execution.

Using Patcher

Patcher works in three stages. First you build your library of patches, which Patcher saves to your drive-zero disk. Then Patcher scrolls you through your library, letting you select the patches you want to install on a disk in drive 1. Next, Patcher creates a build file of those patches and writes it to the disk in drive 1. Once you execute the build file, your patches are permanently installed.

Type in and run Patcher (see the Program Listing). Since you first need to build a library of patches, select the option "Add new patches to file" from the main menu. Patcher prompts you for the file name or system file number (PATCH*), the hexadecimal (hex) add address (ADD=), the hex find code (FIND=), and the hex change code (CHG=):

PATCH*X(ADD=XXXX,FIND=XX,CHG=XX)

You supply the file name or hex numbers for each prompt (indicated by X's in the example above), press the enter key, and

LOAD 80

System Requirements

Model III
32K RAM
Disk Basic
TRSDOS 1.3

```
PATCH *4 (ADD=4E28,FIND=20,CHG=18)
Display error message instead of error code.
PATCH *5 (ADD=52EB,FIND=CB,CHG=36)
1 of 2 to bypass BASIC/CMD protection.
PATCH *5 (ADD=52ED,FIND=BE,CHG=00)
2 of 2 to bypass BASIC/CMD protection.
PATCH *0 (ADD=5039,FIND=20,CHG=0D)
1 of 3 to remove initial boot-up screen.
PATCH *0 (ADD=508A,FIND=28,CHG=0D)
2 of 3 to remove initial boot-up screen.
PATCH *0 (ADD=516C,FIND=D0,CHG=0D)
3 of 3 to remove initial boot-up screen.
PATCH *6 (ADD=616D,FIND=CD8861B7C8FE40,CHG=3A803FD620C8CD)
1 of 2 to list DIR one page at a time.
PATCH *6 (ADD=6174,FIND=2806C547AF78C1,CHG=7C61CDC901AFC9)
2 of 2 to list DIR one page at a time.
PATCH *0 (ADD=4F60,FIND=6B4F,CHG=2542)
Displays name of AUTO file.
PATCH *1 (ADD=4E75,FIND=063E3E,CHG=C37E4E)
Eliminates dots after TRSDOS ready prompt.
PATCH *0 (ADD=4EA9,FIND=CA,CHG=C3)
Removes date prompt.
```

Figure. List of selected patches.

Program Listing. Patches management program.

```
10 '*********************************************************
20 '*** PATCHER/MGR .... main program ***********************
30 '*** PATCHER/LST .... contains patches & descriptions ***
40 '*** PATCHER/BLD .... created by <C>reate option ********
50 '*** Written by Sean E. P. Robinson **********************
60 '*********************************************************
70 CLEAR 2000
80 ON ERROR GOTO 950
90 DIM BLD$(90)
100 CLS
110 POKE 16409,1
120 PRINT@20,"PATCH MANAGEMENT PROGRAM"
130 PRINT@200,"<A>dd new patches to file."
140 PRINT@328,"<C>reate a build file."
150 PRINT@456,"<L>ist patches and descriptions."
160 PRINT@584,"<R>eturn to DOS."
170 PRINT@896,"Enter selection....";:INPUT S$
180 IF S$ = "A" THEN GOSUB 230
190 IF S$ = "C" THEN GOSUB 710
200 IF S$ = "L" THEN GOSUB 720
210 IF S$ = "R" THEN CMD"S"
220 GOTO 70
230 CLS
240 P$ = "PATCH *"
250 PRINT@64,"";
260 LINEINPUT "PATCH *";A$
270 P$ = P$ + A$
```

Listing continued

Circle 424 on Reader Service card.

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Patcher displays the next prompt.

When you hit the enter key after typing in the change code, Patcher ends the patch with a close parenthesis and asks you to describe the patch's function. Since video output is only 64 characters per line, I recommend you limit yourself to a one-line description.

Patcher then prompts you for corrections to either the patch or the description. If you don't need to make changes, another prompt asks whether you want to add more patches to your library. If you answer "yes," the program loops back to the patch prompt again. Answering "no" saves your patches to the file PATCHER/LST and returns you to the main menu.

The Figure provides seven patches to get you started. For more patches, see "Patch Work" (January 1985, p. 112) and "Patch Work II: The Sequel" (August 1985, p. 72).

Customizing Your Disks

Once you have your library of patches in place, you can put a disk in drive 1 and install patches on that disk. You review the patches library by selecting the List option from Patcher's main menu. Patcher displays the first patch in your library, along with its description. You can page through the entire list one patch at a time. When you reach the end of file, the program returns you to the main menu.

Then you select the option to create a build file. Patcher attempts to open a file named PATCHER/BLD on drive 1. If you don't have a disk in drive 1, the program reminds you to insert one.

If no Patcher/BLD file exists, Patcher creates it. If such a file does exist, Patcher overwrites it with the new file.

Patcher clears the screen and displays the first patch in your library with its description, along with a prompt asking if you want to save the patch for a build file, go to the next patch, or return to the main menu. If you save the patch, Patcher writes it, without its description, to the /BLD file and displays the next patch.

If you opt to go to the next patch, Patcher displays the next patch without writing anything to the /BLD file. If you opt to return to the main menu, Patcher closes the files and returns you to the menu.

The last record Patcher writes to PATCHER/BLD is KILL PATCHER/BLD.

Once you finish choosing patches for a disk, return to DOS. You've created a build file with your selected patches on the disk in drive 1. To install these patches on TRSDOS, remove the disk in drive zero and replace it with the disk in drive 1. At TRSDOS Ready, type in DO PATCHER/BLD. The Build file installs the patches on your disk and commits hara-kiri.■

Write to Sean E.P. Robinson at 1618 Jennings Court, Frederick, MD 21701.

Listing continued

```
280 PRINT@64,P$;
290 LINEINPUT " (ADD=";A$
300 P$ = P$ + CHR$(32) + "(ADD=" + A$
310 PRINT@64,P$;
320 LINEINPUT ",FIND="; A$
330 P$ = P$ + ",FIND=" + A$
340 PRINT@64,P$;
350 LINEINPUT ",CHG="; A$
360 P$ = P$ + ",CHG=" + A$ + ")"
370 PRINT@64,P$
380 POKE 16409,0
390 PRINT "Describe purpose for this patch."
400 LINEINPUT D$
410 PRINT: PRINT
420 POKE 16409,1
430 PRINT@768,"Are corrections necessary";
440 INPUT AN$
450 PRINT@768,CHR$(255);
460 IF AN$ = "Y" THEN 480  ELSE IF AN$ <> "N" THEN 430
470 GOTO 570
480 PRINT@768,"Make changes to <P>atch or";
490 PRINT@795,"<D>escription";
500 INPUT AN$
510 PRINT@768,CHR$(255);
520 IF AN$ = "P" THEN PRINT@64,CHR$(255);: GOTO 240
530 IF AN$ = "D" THEN 540  ELSE 480
540   PRINT@192,CHR$(255);
550   PRINT@192,"";
560   GOTO 400
570 S = S + 1
580 BLD$(S) = P$
590 S = S + 1
600 BLD$(S) = D$
610 PRINT@768,"Add more patches (Y/N)";
620 INPUT AN$
630 IF AN$ = "Y" THEN 230
640 IF AN$ <> "N" THEN 610
650 OPEN "E", 1, "PATCHER/LST"
660 FOR L1 = 1 TO S
670   PRINT #1, BLD$(L1)
680 NEXT
690 CLOSE
700 RETURN
710 OPEN "O", 2, "PATCHER/BLD:1"
720 OPEN "I", 1, "PATCHER/LST"
730 IF EOF(1) THEN GOSUB 920  : RETURN
740 CLS
750 LINEINPUT #1, P$
760 LINEINPUT #1, D$
770 PRINT P$
780 PRINT: PRINT D$
790 IF S$ = "C" THEN 820  ELSE 800
800 PRINT@768,"<ENTER> for next patch/description."
810 IK$ = INKEY$: IF IK$ = "" THEN 810  ELSE 730
820 PRINT@768,"<S>ave for BLD file,";
830 PRINT@789,"<N>ext patch, or";
840 PRINT@806,"<R>eturn to menu."
850 IK$ = INKEY$: IF IK$ = "" THEN 850
860 IF IK$ = "S" THEN 900
870 IF IK$ = "N" THEN 730
880 IF IK$ = "R" THEN CLOSE: GOTO 70
890 GOTO 850
900 PRINT #2, P$
910 GOTO 730
920 IF S$ = "C" THEN PRINT #2, "KILL PATCHER/BLD"
930 CLOSE
940 RETURN
950 A$ = "Insert a disk in Drive :1 and try again."
960 IF ERR/2+1=54 THEN OPEN"O",1,"PATCHER/LST":CLOSE:RESUME
970 IF ERR/2+1 = 62 THEN PRINT@717,A$
980 FOR L1 = 1 TO 5
990   FOR L2 = 1 TO 50
1000     PRINT@712,"===>";
1010   NEXT
1020   FOR L2 = 1 TO 50
1030     PRINT@712,CHR$(196);
1040   NEXT
1050 NEXT
1060 PRINT@712,CHR$(234)
1070 CLOSE
1080 RESUME 100
```

End

Circle 86 on Reader Service card.

THE RS-232

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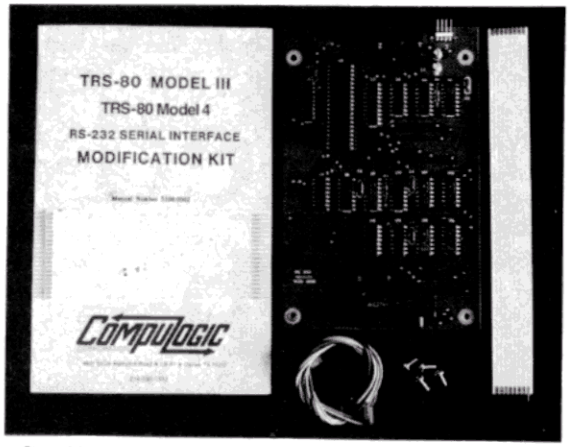

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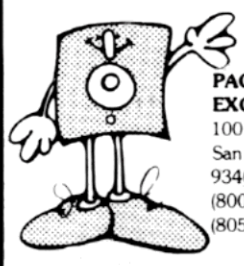

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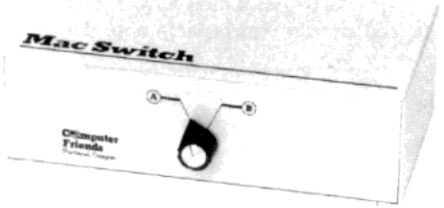

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Two On One: Making Your Printer Do Double Duty

If you have two computers but only one printer, this project is for you. It's a switch box that lets you access the printer from either computer without having to constantly change cables (see Fig. 1). (Next month, I'll describe a box that lets you do the opposite—access two printers with one computer.)

This box is for printers that use a Centronics parallel interface. It works with all TRS-80s and most other computers. (For more on the Centronics interface, read the September and October 1984 Project 80s [pp. 102 and 146].)

Design Considerations

An electronic switch is more reliable than a mechanical one. It is also cleaner, reducing the chance that it might send an extraneous character to the printer.

Also, a computer can control an electronic switch by using one or two digital outputs. This will be useful for next month's project, where your computer can choose whether to send data to a dot-matrix or letter-quality printer.

Building the Board

The schematic for this month's project appears in Fig. 2. The board sports only five integrated circuits (ICs), requiring three 16-pin IC sockets and two 14-pin IC sockets. Table 1 indicates the ICs' power and ground connections.

The board layout I used appears in Fig. 3. You should particularly note the pin-

IC	GND	+5V
74LS00	7	14
74LS32	7	14
74LS157	8	16

Table 1. Power and ground connectors for the integrated circuits (ICs) of the electronic printer box.

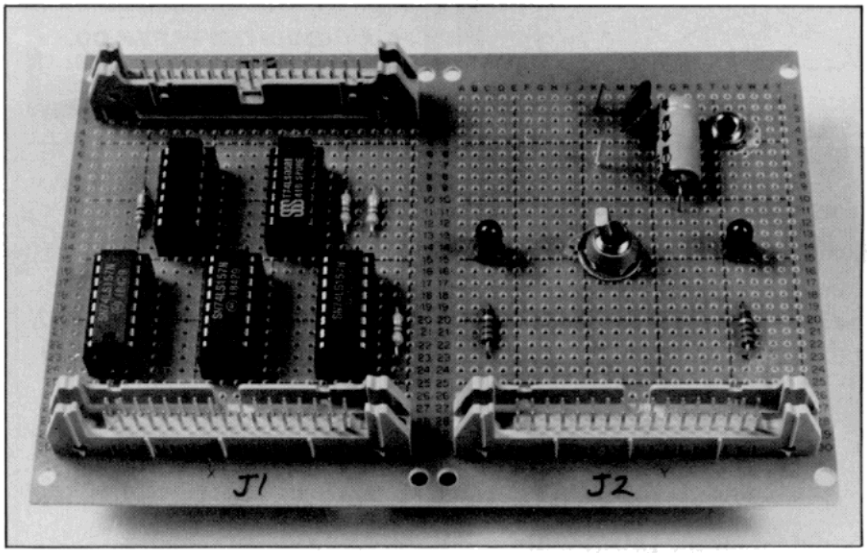

Photo. An electronic printer switch box.

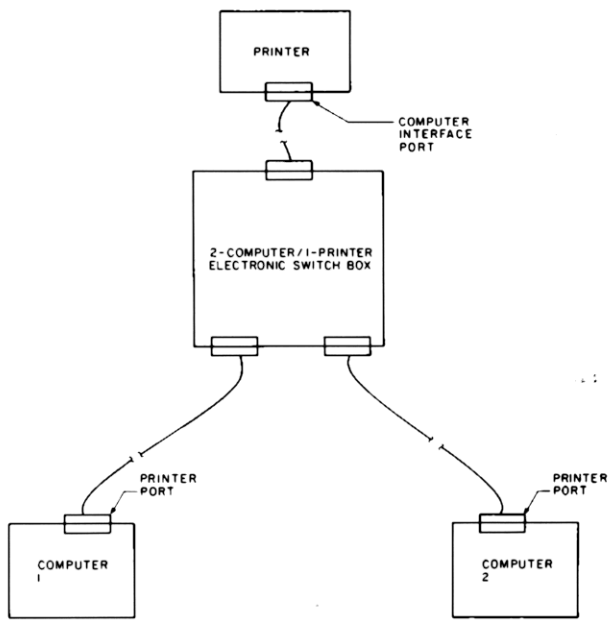

Figure 1. An electronic printer switch box allowing two computers to access one printer.

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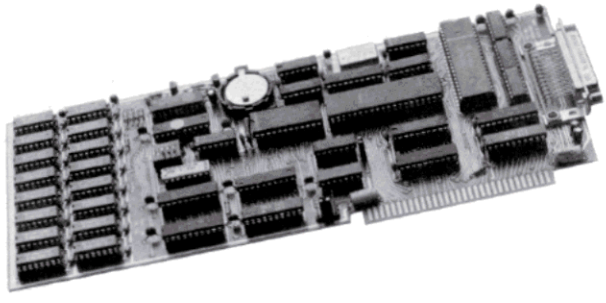

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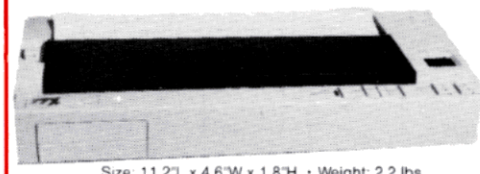

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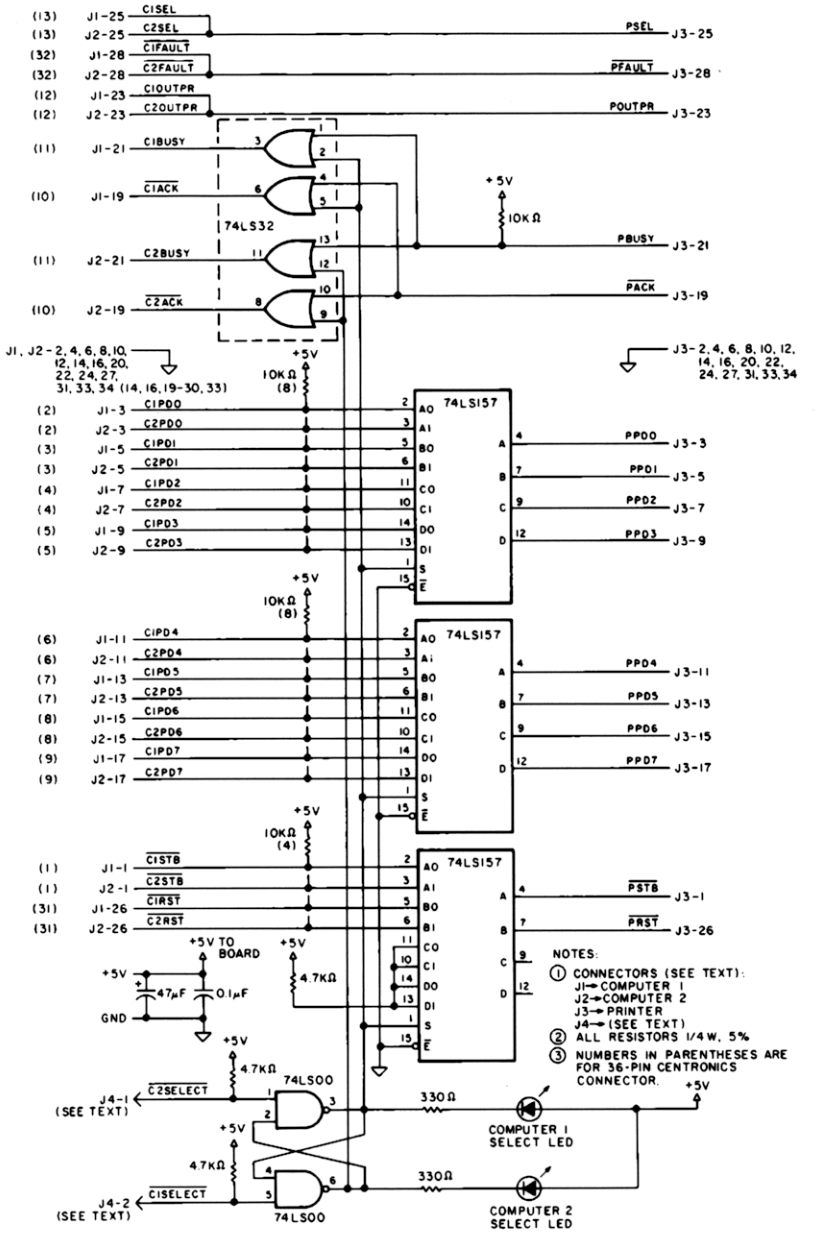

Figure 2. Schematic for the electronic printer box.

1 positions on the three header connectors (J1, J2, and J3). I chose these connector orientations to allow simple ribbon cable connections.

Figure 4 shows a sketch of how you build the cable assemblies. For simplicity, I used ribbon cable and crimp-on header and Centronics connectors. (See Table 2). Again, note the positions of pin 1 for each connector on the different cable assemblies.

J1 and J2 are the interfaces to computer 1 and computer 2, respectively. J3, of course, is the printer interface. The numbers following the dash after the connector identifier for J1, J2, and J3 signals (e.g., J1-17) indicate the pin numbers for the respective header connector (on a header connector, all odd pins are in the same row as pin 1, and all even pins are in the opposite row, with pin 2 immediately opposite pin 1).

The J1 and J2 connector signals also have numbers in parentheses next to them. These indicate the respective (female) Centronics connector pin numbers where the signals should go.

Connecting Signals to the Board

The board provides two special input signals to the board, which you can connect in a variety of ways. The signals are C1SELECT/ and C2SELECT/, and they select which computer accesses the printer. The simplest (and probably most common) connection to these signals is a SPDT toggle switch (see Fig. 5). The toggle switch setting determines which computer the box selects.

Another way to connect to the C1SELECT/ and C2SELECT/ signals is to use two momentary-contact SPST switches (see Fig. 6). This lets you switch computers with the touch of a button. The main disadvantage is that when you turn the switch box on, it will randomly choose which computer to access.

You can also control switching by connecting two digital outputs from the computer to the C1SELECT/ and C2SELECT/ signals, as shown in Fig. 7. You can't have the outputs low at the same time; once a computer select line is low, the selected computer remains selected even after you bring the line high, so bring the current computer select line high before taking the other one low.

In a similar approach, you can use only one digital output from the computer using one of the spare NAND (74LS00) gates on the board as an inverter, as shown in Fig. 8. The switch box selects computer 1 when digital output is low and computer 2 when output is high. This is probably a better approach than the one described above, since you have only one output and you can't inadvertently try to select both computers simultaneously.

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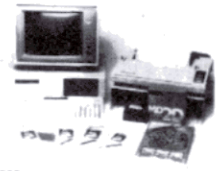

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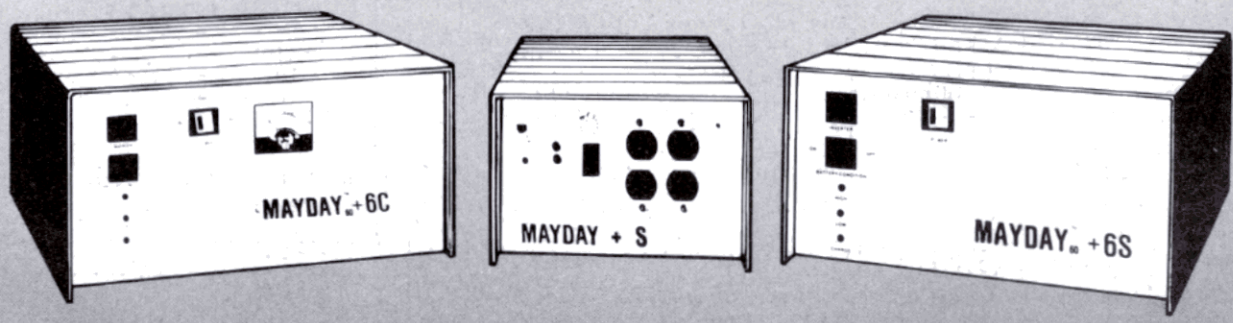

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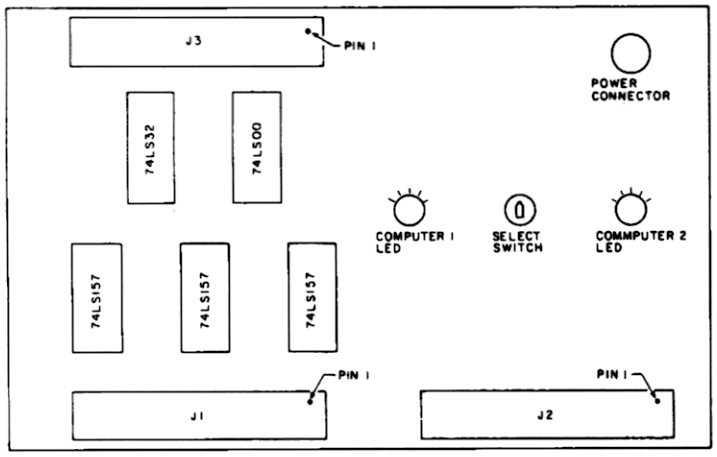

Figure 3. Board layout of the printer box.

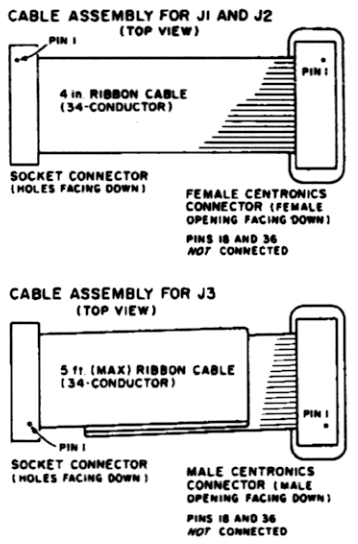

Figure 4. How to build the cable assemblies J1 and J2 (top view).

Quantity	Description	Distributor	Part Number	Price (Each)
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1	74LS00 quad two-input NAND gate (LS TTL) IC	JDR	74S00	.24
1	74LS32 quad two-input OR gate (LS TTL) IC	JDR	47LS32	.29
2	Red light-emitting diodes (LEDs)	RS	276-041	.35
2	330-ohm resistor (.25 watt)	RS	271-1315	.08
3	4.7k resistor (.25 watt)	RS	271-1330	.08
21	10k resistor (.25 watt)	RS	271-1335	.08
1	47 uF/50-volt electrolytic capacitor (PC mount	RS	272-1027	.69
1	.1 uF/50-volt disc capacitor	RS	272-135	.25
1	SPDT micromini toggle switch*	RS	275-625	1.59
3	34-position cable header (W/W)*	DK	R230-ND	1.90
3	34-position ribbon cable socket connector*	DK	R305-ND	2.24
1	36-position Centronics-type ribbon cable connector (male)	JE	CEN36M	8.69
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* See text.

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Table 2. Electronic printer box parts list.

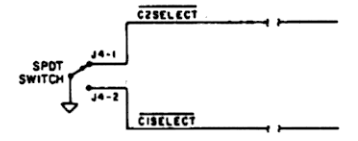

Figure 5. How to connect the SPDT toggle switch.

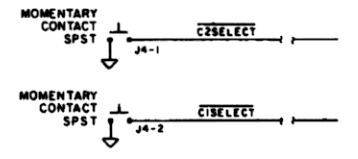

Figure 6. How to connect the SPST switches.

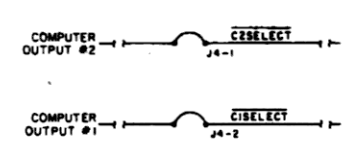

Figure 7. How to connect two digital outputs to the printer box.

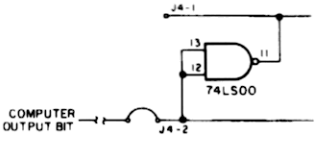

Figure 8. How to connect a single digital output to the printer box.

Besides the items indicated on the parts list or already mentioned, you will need a +5-volt power supply capable of supplying at least 100 milliamps.

Operating the Switch

How you operate your switch depends partly on how you connect the C1-SELECT/ and C2SELECT/ signals. The remainder of this discussion will assume you chose the SPDT toggle switch, but you should be aware of any differences that might apply if you chose one of the other methods.

The two NAND gates act as a debounced latch that selects which computer has access to the printer. At any given time, the lit LED indicates which computer currently has access to the printer.

The 74LS157s are quad two-to-one multiplexers. These ICs switch the various output signals from the selected computer to the printer. The eight data output lines, the data strobe, and the printer reset signals are switched using the 74LS157s. The 10k pull-up resistors on the inputs to the 157s are just in case one or both of the computers aren't connected.

The box uses the 74LS32 to switch two of the printer output signals to the selected computer. It routes three printer output (status) signals directly to both computers. The 74LS32 OR gates perform an important function: They guarantee that the computer not selected will see that the switched printer signals (particularly the busy signal) are high so the computer won't try to send the printer any information. The 10k pull-up resistor on the printer's busy output line assures that the selected computer will see a busy printer if the printer is not connected.

To operate the electronic switch, plug the printer cable from one or both computers into the desired female Centronics input connectors on the switch, and connect the male Centronics output connector to the printer. Now you select which computer gets the printer. You should turn on the electronic switch before you do the printer and computer. ■

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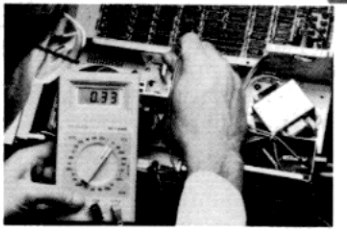

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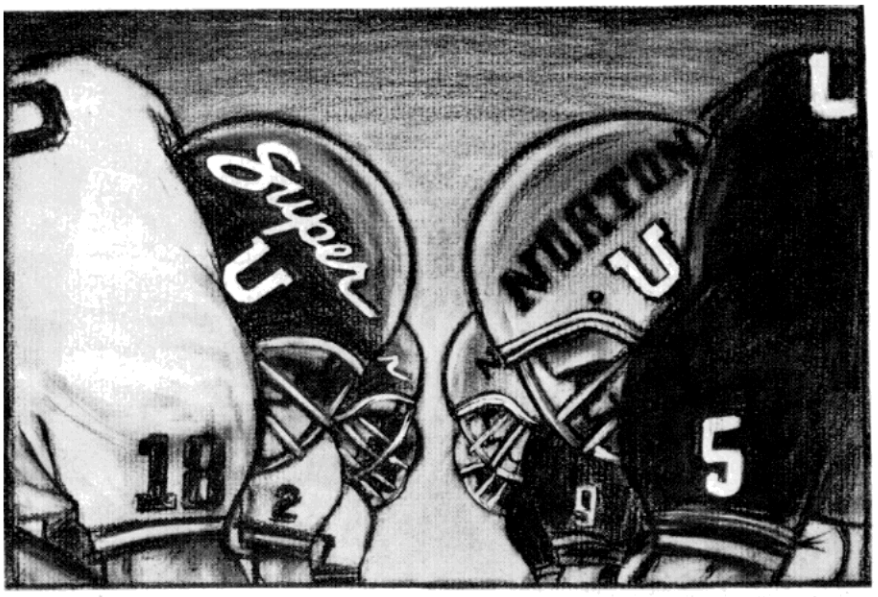
Utilities Included: Comparing Super U and The Norton Utilities



The new MS-DOS version of Powersoft's Super Utility (SU) is in my hands. I hope you don't mind if I spend part of a column comparing this newcomer with the Norton Utilities (NUs). Every MS-DOS micro owner should know what these two packages can do.

I'll also look at contenders for Tandy 1000 Multifunction Board of the Year.

More Power to You

I half expected the new SU to blow the NUs away, but they're running neck and neck. Both let you examine and modify disk files and sectors on any floppy, hard, or RAM disk, in ASCII or hexadecimal (hex). Both recover erased files and lost text data. Neither is copy-protected.

And each has its own specialties and extras. SU custom-configures hard drives and more easily writes disk sectors to a file. The Norton Utilities give you an array of small utility programs, including a sophisticated directory sort and a beeper for your batch files.

In spite of similar abilities, the programs have different approaches and feels. The Norton Utilities are for less-experienced users. If you want to recover an erased spreadsheet, you select Recover Erased File from the main menu. The Utilities then hand-hold you through the recovery process, explaining each choice succinctly. Super Utility is more for the hacker. If you want to check your disk, you select Verify Sectors from the main (and only) menu and enter a range of sectors to verify.

The new SU is less powerful than the TRSDOS versions, but also easier to use and less dangerous. You can't even delete files; there's no dark side of the Force for novice glitch fighters.

To give you a feeling for the differences and abilities of these two data savers, I'll describe how each recovers erased files.

Although it's easy with SU, you must read the manual to know how. Select Directory and File Changes from the main menu, press the letter of a drive, and you're presented with a list of files, subdirectories, and the volume label (if present) for the selected disk. Each entry includes all directory information, some of which (name, extension, and attributes) you can change by editing the list on-screen.

The page keys take you in and out of subdirectories. Deleted directory entries also show up, and they're blinking. Select a deleted entry with the cursor and you've started the recovery process.

If DOS hasn't allocated the first sector to another file, SU displays each sector of the deleted file in ASCII, one by one, along with directory data about the file. You press the enter key to save each sector. This can get tedious if you've got a long file.

If MS-DOS has reallocated the first sector that the deleted file's file allocation table (FAT) points to, SU will tell you to use the Sector Modify option. There you can search all sectors for a specified snatch of text you think is in the file. If you find any of the sectors you're looking for, you note their numbers and use the Sector Copy option to write them to a file.

The Norton Utilities' Recover File option gives you a menu of function key options arranged in the order of suggested use. Pressing F1 selects a drive and directory, and F2 brings up a list of deleted directory entries. You select the file you want to recover and replace the first letter of its name (changed in the directory sector to a deleted code). F3 displays all pertinent information about the file, whether you can recover it easily, and the disk sector at which it started.

The real recovery starts with the Recover Data choice. Here, you're given four ways to get back your lost sectors. If you just erased the file, you choose F1. The NUs determine which sectors belonged to the file and restore them in one operation. Or you can look at one sector at a time. If the first sector now belongs to another file, you can use the two remaining options: to search all unallocated sectors for a specific string of data you know is in the file, or just to specify a sector by number, view it, and decide whether to include it. This last option is the only way you can write sectors to a file with the NUs. You can only write unallocated sectors to a file name that's been deleted, the "normal" situation.

The two packages don't differ much in how they let you view and modify disk sectors once you've selected a file of a sector number. Both display hex characters on the left and the corresponding ASCII code on the right. You can modify bytes in either mode.

Moving from sector to sector is easier in SU. You can put it in repeat paging mode or specify a given sector by number. The SU sector editor also includes an ASCII search function. I was sur-

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4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEVN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REQWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLETE	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model-i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQUOQ	Fixed quantity economic order quantity model
53	FQEOWSH	As above but with shortages permitted
54	FQEOQPB	As above but with quantity price breaks
55	QUEUECB	Cost benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project
59	WACC	Weighted average cost of capital
60	COMPBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSBUD	DOME business bookkeeping system
77	TIMECLCK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFFD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertable bond
100	PORTVAL9	Stock market portfolio storage-valuation program

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prised that SU has no hex search capabilities (neither do the Norton Utilities). The NUs offer several additional display modes: one to display a directory sector and one that just shows ASCII. The latter even displays WordStar files by stripping the 8th bit from the last character in each word.

One big difference between the two is that SU is an all-in-one program, whereas many of the Norton Utilities' capabilities are in its separate utility programs. In most cases this makes sense because the utilities are unrelated to the core program. Separate utilities search the disk for a text string, search all subdirectories for a given file, give the total size of a group of files, and change the attributes of a file. Unlike version 2, the latest Norton Utilities won't change the hidden and system attributes. The directory sort program can sort a directory (or subdirectory) by name, extension, date, time, or size, or any combination of some or all.

You also check a disk with a separate utility. Rather than specify a range of sectors as you do with SU, you add parameters to the command that specify the whole disk (/D for checking all sectors), the area occupied by directories and files only (/F for a file check), or both. The Norton U's VL utility not only can change a disk's name but, unlike SU, it can also name an unnamed disk. One other NU program worth mentioning is the line print formatter, which will print a text file with the margins, page size, and page numbers you specify.

The SU manual, not as informative as the Norton Utilities', warns of possible incompatibility problems with some RAM disk, network, and print-spool software. I had no problem with the Tanpack RAM disk I'm using.

So I don't know what to tell you. The Norton Utilities and Super Utility are both capable and easy to use for utilities. The NUs are easier for someone who has just lost a file and hasn't used a utility like this before. For someone editing files all the time, SU is quicker to use. For those who range in between like myself, either will do fine.

Boards for the 1000

I'll be reviewing add-on boards for the 1000 in the December 1985 issue, but I thought you'd like a preview of two of the most promising multifunction boards: the Tanpack from Hard Drive Specialist in Houston, TX, and the MFB-1000 from PBJ Inc. in N. Bergen, NJ. Both boards supply direct memory address (DMA), an RS-232 port, a clock, and up to 512K additional memory. The Tanpack also comes with RAM disk and printer spooler software. I've been using both boards with full memory and no problems. Prices with 512K are $549 for the Tanpack and $430 for the MFB-1000.

The Tanpack is a bruiser. It just fits into the available space, and has a smaller sideboard sandwiched on it for the DMA controller. I installed it easily, and the instructions are excellent. You can set up the RAM disk driver for up to 512K and install it in your CONFIG.SYS file. One clock program both sets the battery-powered clock and the system date/time on boot-up (from the AUTOEXEC.BAT file). You can set the print spooler for 1–64K. All software is well designed and easy to use with error traps for all conceivable situations.

The Tanpack's serial port is female like Tandy's serial board, but unlike IBM's. My only complaint, so far, is that you must pry off the sandwich board to change the lithium battery or to set the serial port as COM1 or COM2.

PBJ gets everything on one board (no sandwich) with room to spare. It doesn't let you configure the serial port, which must be COM1. The RS-232 connector is

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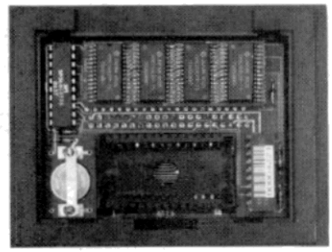

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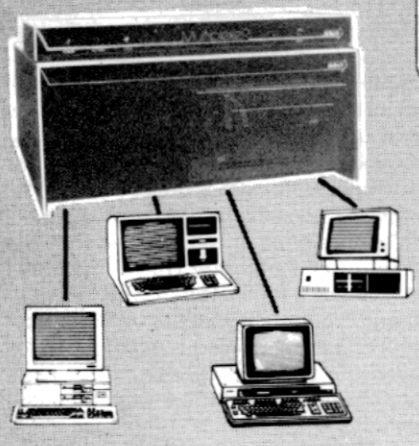

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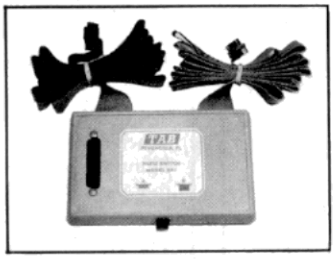

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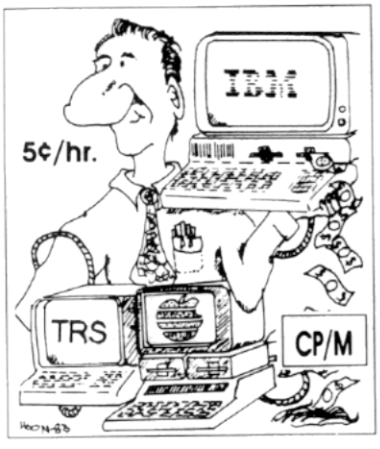

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male (like the IBM's), requiring a "gender bender" if you're using Radio Shack cables.

The clock software is the slickest I've seen yet. It's a small driver program you install in the CONFIG.SYS file so it sets the system date/time on boot-up. You set the clock (also lithium-powered) with the regular DOS Date and Time commands. It works with the Tanpack RAM disk driver. You'll encounter one minor annoyance when you use your clock-configured DOS to boot up a machine without the board: It hangs up.

Tandy should have a multifunction board out by the time you read this. For $320 it comes with 256K, DMA, expansion space for mouse or RS-232, and up to 512K of RAM.

Tandy has reacted quickly to competition from outside vendors, but it sounds like too little, too late. When you add all the options, it'll be more expensive than the Tanpack and MFB-1000, and kludgy to boot.

DOS Talk

Larry Hall of Coos Bay, OR, has brought to my attention that none of the Tandy 1000 manuals (not even the MS-DOS manual) document CTRL/ALT/DEL as an alternative to the orange reset button. If you're a former IBM user, that's probably one of the first things you tried; it's the only way to reset an IBM. It doesn't always revive the IBM PC after a serious crash, so Tandy added a reset button to the 1000 and 2000, in the Model I/III/4 tradition.

Several people have noticed that the 1000's original MS-DOS doesn't have a Mode option to redirect the printer port to a serial port (MODE LPT1: = COM1) as the IBM does. The 1200 has the option, but it doesn't work. I've heard of two cases where 1000 owners used PC-DOS's Mode to get the desired results, but you might get strange and unpredictable side effects. The updated 1000 DOS does have the option, and Tandy's Computer Customer Support in Fort Worth has a fix for the 1200 Mode command. You might also find a 1200 hardware fix that solves the problem, available at Radio Shack Repair Centers, according to Dave Frager, buyer for Tandy's MS-DOS line.

8087 Chip in 1200

Doug Hogarth, programmer at Powersoft, reports that the Intel 8087 math coprocessor chip won't work as is when plugged into the appropriate Tandy 1200HD socket; it causes lock-ups. You can solve the problem by bending up pin 33 on the 8087.■

Dave Rowell is a technical editor for 80 Micro.

Money Box

Twentieth Century Shoebox ($29.95 plus $3 shipping) from Levins Engineering Inc. lets you organize home budgets, travel expenses, coupons, tax records, and more on your Model 1000.

The program introduces "entry-first" accounting—you input entries and add words called tags, notes, and categories instead of predefining an accounting structure. An entry can be anything characterized by an amount and a date. As you input more entries, a way to organize them arises naturally and intuitively. Tag matching automatically classifies many of the entries.

The Twentieth Century Shoebox has edit, report, and browse functions. For more information, contact Levins Engineering Inc., P.O. Box 275, Palmetto, FL 33561, 301-564-8333.

Circle 570 on Reader Service card.

Fast Messages

BBS-PC from Micro-Systems Software Inc. is a full-featured electronic bulletin board software system for IBM PC and compatible systems, including the Models 1000, 1200, and 2000.

The system supports electronic mail, program or data file exchanges, and more. It provides 16 separate sections, four different file transfer protocols, and a terminal mode feature that supports a second modem, COM port, and phone line to permit answering one modem and dialing out on the other.

The systems operator has complete control over access to the system and each of its 16 sections. The BBS-PC allows up to 256 levels of security in both message base and upload/download data base. It also offers full upload/download in four protocols, including XModem and standard ASCII.

BBS-PC requires 256K and the price is $249. For further details, contact Micro-Systems Software Inc., 4301-18 Oak Circle, Boca Raton, FL 33431, 305-391-5077.

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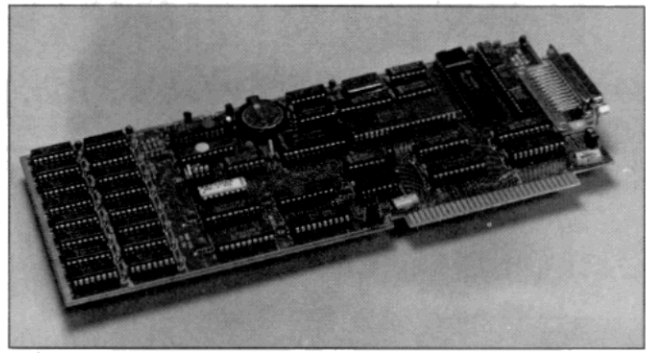

Expand the functions on the Model 1000 and 1200 with the MFB-1000 board.

Board Expansions

PBJ Inc. sells a multifunction expansion board, the MFB-1000, for the Tandy 1000 and 1200. The board contains up to 512K of memory, a serial communications port, and a battery-backed real-time clock/calendar. It also has the required DMA controller for the Model 1000. You can disable the controller if you use a Model 1200.

The MFB-1000 comes with 128K ($329.95), 256K ($369.95), or 512K ($429.95) of RAM. For more information, contact PBJ Inc., P.O. Box 813, North Bergen, NJ 07047, 201-330-1898.

Circle 572 on Reader Service card.

Spelling Bee

Paperback Speller ($39.95) from Paperback Software checks and corrects spelling in documents created by Paperback Software's own Executive Writer and Paperback Writer, as well as other word processing programs such as WordStar and Volkswriter Deluxe.

The program lets you correct misspelled words in a document as they are found. The main directory in Paperback Speller contains over 60,000 words. It also uses compound word and suffix logic to extend the effective size of the dictionary to over 100,000 words.

Paperback Speller runs on the IBM PC and the compatibles. For more information, contact Paperback Software International, 2612 Eighth St., Berkeley, CA 94710, 415-644-2116.

Circle 576 on Reader Service card.

Better Looking Words

PowerText Formatter ($49.95 + $5 shipping) is a word processing add-on that lets you produce complex styles and formats on your printer. You get documents with justified, true proportional text, footnotes on the same page (automatically placed and numbered), multiple columns of text and/or numbers, outlines with automatically numbered and indented entries, wide documents, and more.

The program includes a number of print drivers along with a printer installation program that lets you run PowerText Formatter with any printer. With the appropriate print driver, the program permits super- and subscripts, underlining, bold and wide printing, and changes of pitch and type style.

PowerText Formatter works with any word processor that produces standard ASCII files. You need 192K and two disk drives or a hard disk. For more information, contact Beaman Porter Inc., 417 Halstead Ave., Harrison, NY 10528, 914-835-3156.

Circle 575 on Reader Service card.

Learn That DOS

How To Use MS-DOS is an audio cassette course from FlipTrack Learning Systems. It's a step-by-step, self-study approach to mastering the keyboard and all of the system's essential operating commands.

The course teaches you basic procedures like formatting and copying disks and managing individual files. It also covers special features of MS-DOS, such as creating tree-structured directories, working with a hard disk system, and using batch processing.

The three lessons are about two hours each and you can use any standard cassette player. For more information, contact FlipTrack Learning Systems, 999 N. Main St., Glen Ellyn, IL 60137, 800-222-3547 or 312-790-1117.

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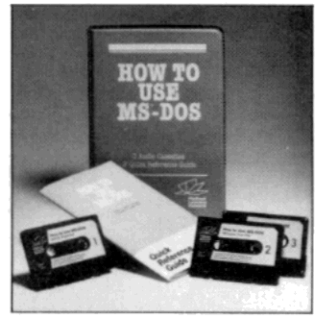

A self-study approach to learning MS-DOS.

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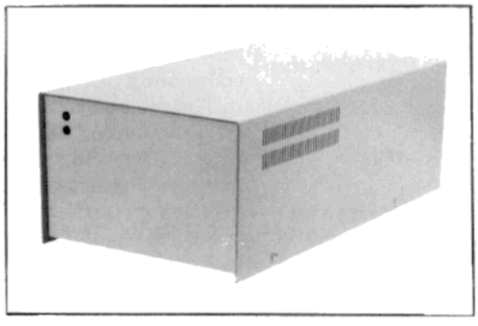

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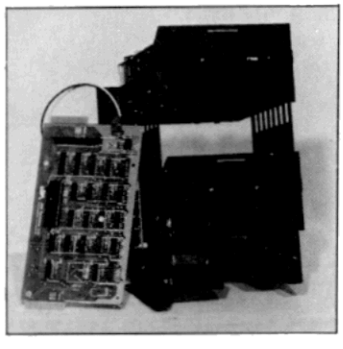

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Order Out of Chaos: A Look at Random-Access Files

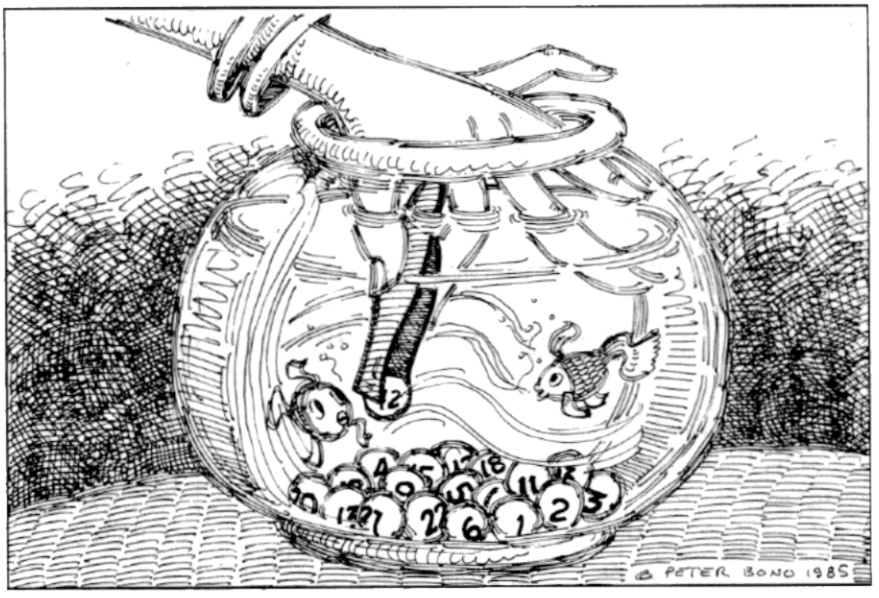

Illustration by Peter Bono

Last month I discussed sequential-access disk files, likening them to a fish bowl filled with a strand of beads. To reach a bead at the middle of the strand, you have to remove each previous bead.

Without explaining, I compared random-access (also called direct-access) disk files to that same bowl filled with unstrung beads, any one of which you could magically and precisely tweeze from the mass. I now have that bowl of loose beads on my desk and will attempt to explain how it works.

Getting Acquainted

Type in and run Program Listing 1, Random-Access Demo. Running this demo gives you the feel for working with random-access files.

Each piece of data you input goes into a separate numbered record that holds from 1 to 256 characters. A disk file can accept more than 65,000 records if the disk has enough room.

In lines 150 and 250, the R stands for "random." The first 1 stands for buffer 1. The program puts data into a buffer before writing it to the file. The 1 at the right is the record length; I'll use a single-character string in this particular example.

In the Field statement in line 160, the first 1 represents the buffer number, and 1 AS N$ specifies the number of characters the field variable will hold—here only one. See the Table for a description of program flow.

Making Things Clear

Random-Access Demo shows form but not much versatility. Before moving on to power, I'll briefly cover statements and functions used for random-access files:

- OPEN "R", 1, "file name", 1 opens a disk data file, specifying the random (R) mode, a buffer number of 1–15, a file name, and a record length limiting the

System Requirements

Models I, III, and 4
32K RAM
Disk Basic

Line(s)	Description
140	Sets variable L, record number, to 1.
150	Opens a file named DEMO.
160	The Field statement.
170–180	Prompts for one-character or two-character input.
190	Puts character in the buffer.
200	Puts buffer 1 data into record L on the disk.
250	Reopens the disk file.
260	The same field statement as in line 160.
270	Begins a loop from 1 to last of file 1, LOF(1).
280	Reads the value of record X into buffer 1.
290	Prints the value read from the buffer.
300	Ends the loop.
310	Closes the file.

Table. Line description for Program Listing 1.

Program Listing 1. Random-Access Demo.

```
100 REM * Direct-Access Demo *
105 REM * Listing 1, Basic Takes
110 REM * Lines 140-220 put data in file *
120 CLS
130 CLEAR
140 L=1
150 OPEN "R",1,"DEMO",1
160 FIELD 1, 1 AS N$
170 INPUT "Type 1 character to store, 2 to end -- and press enter";N1$
180 IF LEN(N1$)>1 THEN CLOSE 1: GOTO 240
190 LSET N$=N1$
200 PUT 1,L
210 L=L+1
220 GOTO 170
230 REM * Lines 250-310 print data from file *
240 CLS
250 OPEN "R",1,"DEMO",1
```

Listing 1 continued

number of characters in each record. If you omit the record length, the program defaults to 256 characters.

- The Field statement divides the buffer into fields holding variable values. FIELD 1, 20 as A$, 4 as B$, assigns 20 characters to A$, four to B$. The length of the data may be less than the field length.
- LSET puts data to the left in the field and RSET puts it to the right. The form is LSET "Field Variable = value."
- The Put statement writes the data in the buffer to the record. PUT 1, 100 writes the data in buffer 1 to the disk as file record 100. Record numbers use integers from 1 to 65535.
- The Get statement assigns data from a disk file to the buffer. GET 1, 100 puts the data in record 100 into buffer 1.
- The Close 1 statement closes a file with a buffer number of 1. Any program that opens a file must close it before the program completes the run. Otherwise, the program may not write all data to the file, and a program can't open an open file.
- LOC returns the current record number, as in A = LOC(1), where 1 represents the buffer number. It's a handy way to locate material within files.
- LOF returns the final record number assigned to the file, as in LOF(1).
- MKS$, MKD$, MKI$ turn numeric values into strings so you can put them in a buffer. The form is LSET N$ = MKS$(N), where N is a numeric. MKI$ means "make integer" and returns a 2-byte string. MKS$ stands for "make single-precision" and returns the number in a 4-byte string. MKD$ means "make double-precision" and returns an 8-byte string.
- CVS, CVD, and CVI restore the strings to numerics. CVD matches MKD$ and turns an 8-byte string into a double-precision number. CVS and MKS$ are a pair, and CVS returns a 4-byte string to a single-precision number. CVI returns a 2-byte string to an integer and is the inverse of MKI$.

Try Program Listing 2, Number-String Conversions. When the program asks you to enter a number, try integers like 1, 10, and 50, and decimals such as 22.999 and 100.40. The program stores and reclaims the three forms of the same number.

Working with OZ

Try three listings that address the same file, OZ, with different effects. Program Listing 3, Set Up, establishes a file named OZ containing the first and last names of students who will be graded in three tests. Line 140 is a field statement that allows 17 characters for the first (F$) and last (L$) names of each student and four characters for each of the three tests; line 200 assigns each test field a starting value of zero.

You may have as many students as you want. Entry continues until you

Listing 1 continued

```
260 FIELD 1, 1 AS N$
270 FOR X=1 TO LOF(1)
280 GET 1,X
290 PRINT N$
300 NEXT
310 CLOSE 1
320 END
```

End

Program Listing 2. Number-String Conversions.

```
100 REM * Number-String Conversions
105 REM * Listing 2, Basic Takes
120 CLS
130 CLEAR
150 OPEN "R",1,"CONV",30
```

Listing 2 continued

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Listing 2 continued

```
160 FIELD 1, 10 AS N$, 10 AS P$, 10 AS Q$
170 INPUT "Type a number and press enter";N
180 LSET N$=MKI$(N)
190 LSET P$=MKS$(N)
200 LSET Q$=MKD$(N)
210 PUT 1,1
220 CLOSE 1
230 OPEN "R",1,"CONV",30
240 FIELD 1, 10 AS N$, 10 AS P$, 10 AS Q$
250 GET 1,1
260 PRINT CVI(N$);CVS(P$);CVD(Q$)
270 CLOSE 1
280 END
```

End

Program Listing 3. Set Up.

```
100 REM * Set Up *
105 REM * Listing 3, Basic Takes
110 CLS: CLEAR
120 OPEN "R",1,"OZ",46
130 L=LOF(1)+1
140 FIELD 1, 17 AS F$, 17 AS L$, 4 AS T$(1), 4 AS T$(2), 4 AS T$(3)
150 PRINT "Press * to end, any other key to continue."
160 V$=INKEY$: IF V$="" THEN 160 ELSE IF V$="*" THEN CLOSE 1: END
170 CLS: PRINT "Record"L
180 INPUT "First name";F1$: LSET F$=F1$
190 INPUT "Last name";L1$: LSET L$=L1$
200 FOR X=1 TO 3: LSET T$(X)=MKI$(0): NEXT X
210 PUT 1,L: L=L+1: GOTO 140
220 END
```

End

Program Listing 4. Assign Grade.

```
100 REM * Assign Grade *
105 REM * Listing 4, Basic Takes
110 CLS: CLEAR
120 PRINT "You will assign grades for a test."
130 PRINT "Type 1, 2 or 3 for test number, press Enter."
```

Listing 4 continued

type in an asterisk to end the run. You may add names in subsequent runs because line 130 sets the starting record number at one past the end of the last record currently in the file. LOF(1) returns the number of the last record under buffer 1. When you try this program include the name Barbara Hope, so I can show you something later.

Program Listing 4, Assign Grade, lets you choose the test number, then assign each student a numeric grade. It runs from first to last record in the file, using LOF.

How do you know who or what is where among the record numbers of the files? You should keep a numbered printout of records when delving into the files.

You can have tests and actions in a program. Say Barbara Hope had a dismal grade on test 2, but you agree to raise her grade in light of a special report she made. Add this routine to Listing 4:

```
115 GOTO 150
185 GOTO 205
205 IF INSTR($,"Barbara")>0 AND
INSTR(L$, "Hope")>0 THEN LSET T$(2)=
MKI$(100):PUT 1,L:CLOSE 1: END
210 NEXT L: CLOSE 1
```

This listing overlays earlier material, so save it with a different file name.

Program Listing 5, Report, prints out a report of all grades for students in the OZ file. In line 180 note the Print Using

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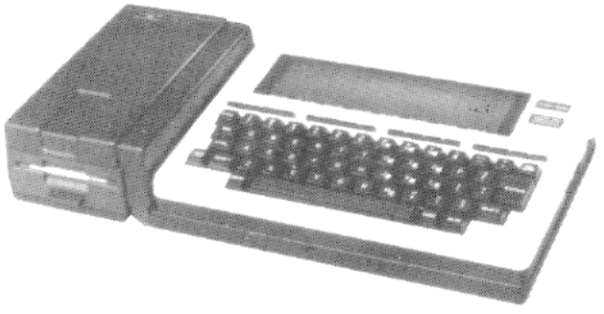

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Listing 4 continued

```
140 INPUT B: IF B<>1 AND B<>2 AND B<>3 THEN CLS: GOTO 130
150 OPEN "R",1,"OZ",46
160 FOR L=1 TO LOF(1)
170 FIELD 1, 17 AS F$, 17 AS L$, 4 AS T$(1), 4 AS T$(2), 4 AS T$(3)
180 CLS: GET 1,L: PRINT F$" "L$" "
190 PRINT "Grade for test"B: INPUT T(B)
200 LSET T$(B)=MKI$(T(B))
210 PUT 1,L: NEXT L: CLOSE 1
220 END
```

End

Program Listing 5. Report.

```
100 REM * Report *
105 REM * Listing 5, Basic Takes
110 CLS: CLEAR
120 OPEN "R",1,"OZ",46
130 FIELD 1, 17 AS F$, 17 AS L$, 4 AS T$(1), 4 AS T$(2), 4 AS T$(3)
140 CLS
150 FOR L=1 TO LOF(1)
160 GET 1,L
170 PRINT F$" "L$" ";
180 PRINT USING "###  ";CVI(T$(1));CVI(T$(2));CVI(T$(3))
190 NEXT L
200 CLOSE 1
210 END
```

End

statement when printing numbers.

What do you do if you try to print file records and get gibberish? Check the balance of CVI to MKI$ and the other two string-numeric switchers. Make sure you have an LSET or RSET statement and that you haven't tried to put the field variable into the buffer, as in LSET N$ = N$. Make sure you assign enough field space to hold the longest variable. If you haven't, strings are truncated on the right, and numerics can be wrong.

Start simply. Random-access files are more complex than sequential-access, and the user can take more wrong turns. But they're great for keeping records, mail lists, inventories, and the like.■

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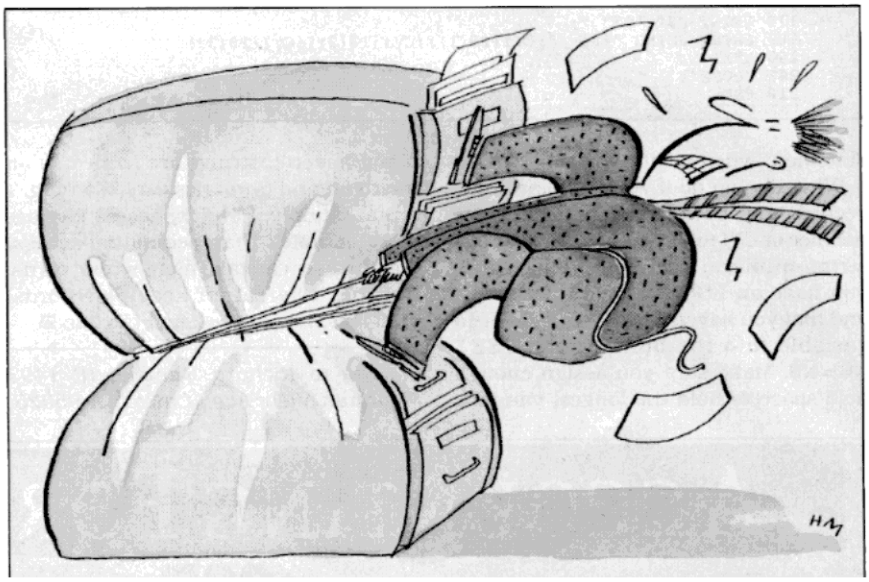
Out with the Old: Condensing Random-Access Files



If you use a data base with random-access files, you could have problems condensing a file after deleting records. You usually must copy the valid records to a new file, which can be impossible if the data base is large and you have only two drives.

LBasic, the disk Basic that comes with Model I/III LDOS, provides a command called Set EOF with which you can set the end of the file at any record you wish. The system automatically releases all the disk file space past that record.

TRSDOS 6.X and MBasic on the Model 4 have no such function. However, the deallocation utility in Program Listing 1 will do the same job. Program Listing 2 is a Basic version if you don't have an editor/assembler.

Facts About Files

When you open a random-access file, no matter what the language, TRSDOS reads information about the file from the disk directory and copies that information into a special data structure called the file control block (FCB). Unless TRSDOS stores the file in more than four pieces (or extents) on the disk, it doesn't have to read the directory again until you add records or close the file. That's because TRSDOS has the information it needs in the FCB to perform all other file functions.

The FCB is a fairly complex data structure of exactly 32 bytes in all popular DOSes except Model III TRSDOS (which has its own way of doing things). The meaning of each byte of the TRSDOS 6.X file control block is defined in the software section of the Model 4 *Technical Reference Manual*. For your purposes, you need only concern yourself with 8 of those 32 bytes.

If you write in machine language, your program must take a very particular set of steps to open and use a data file. First, you must point the HL register pair at the filespec (which must be stored somewhere in memory) and the DL register pair at the 32 bytes you want to use as a file control block. Your program must then call the @FSPEC supervisory call (SVC).

The @FSPEC SVC moves the filespec into the FCB, converts all lowercase characters to uppercase, and does some checking to insure that the string of characters in the filespec looks like a valid file name. If @FSPEC reports no error, your program can then go on to the next step of actually opening the file with either the @OPEN or @INIT SVC. If the file already exists, these two SVCs are identical; if the file doesn't exist, @INIT will create it but @OPEN will report an error.

Once you open the file, the FCB contains directory information about it. The program completely obliterates the filespec originally in the FCB. When you close the file, the program returns the file name to the FCB, but without any password included in the original filespec.

If you program in Basic, you need not worry about anything but giving the proper Open and Close commands. Basic sets up the FCB for you and makes the proper SVC calls to TRSDOS.

Besides the FCB, an open file has two other important data structures associated with it. The first is a 256-byte sector buffer that TRSDOS uses to transfer information to and from the disk. If you use files with a logical record length other than 256 (a full buffer) or 1 (which is usually used for sequential files), your program must also define a user buffer, or UREC, of the same length as each record.

When you open a file, the FCB contains a couple of flag bytes, the logical record length of the file, a 2-byte pointer to the beginning of the file, a 3-byte pointer to the end of the file, another 3-byte pointer to the next logical record, the address of the sector buffer, the disk

LOAD 80

System Requirements

Models 4 and 4P
TRSDOS 6.2
Disk Basic
Editor/assembler

Illustration by Hal Mayforth

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location of four of the file's extents, and a couple of other bytes of miscellaneous information. To release space from the end of a file, you need only worry about the 3-byte pointers and the flags.

Unlike Basic, TRSDOS knows nothing about the distinction between sequential and random-access files. However, it does know that when the time comes to close a file, it must sometimes add a new end-of-file (EOF) pointer to the directory entry on disk and at other times must leave the EOF pointer untouched. You want TRSDOS to update the EOF pointer when you use a file for sequential output or when you add records to the end of a random file. Normally, you want to leave the EOF pointer alone when you use a random file without extending it.

TRSDOS determines whether it should update the EOF pointer by the SVCs a program uses to access information. If your program uses the @POSN SVC, normally used only for random-access files, it sets bit 6 of the second byte of the FCB to indicate that the EOF should be updated only if it extends the file. If you don't use the @POSN SVC, the program doesn't set that bit and, when it closes a file, it updates the information in the disk directory to set the EOF according to the information in the FCB.

That single update bit is the key to deallocating space from a file. If you set that bit to zero, set the EOF pointer in the FCB to include the last record you want to keep, and then close the file, TRSDOS deallocates all disk file space from that record on and lets you use that space for other files.

Listing 1 is an Assembly-language program that demonstrates the technique. The first part of the program defines the SVCs that you'll use, as well as four simple macro instructions. If you use Radio Shack's ALDS assembler, you need not include the SVC macro because it is already defined in the assembler.

The actual program begins on line 670 by clearing the screen and displaying an opening message. Then it asks you for a filespec, moves that filespec to the FCB, and checks to be sure that the filespec is valid (line 790). Next, the program asks you to enter the logical record length of a file, and again checks for a valid answer. If it reports no errors, it opens the file in line 1000.

When you first create a file, the program stores the logical record length you specify in the file's entry in the disk directory. Although you can open the file later with a different logical record length, the value in the disk directory never changes. One of the errors that the @OPEN SVC may report is that the program opened a file with a different logical length than was originally used to

Program Listing 1. Assembly-language version of Filechop.

```
00100 ;-----------------------------------------------------------------
00110 ;
00120 ;          Model 4 FILE-CHOP Demonstration Program
00130 ;               For use with TRSDOS 6.2 only
00140 ;                 Assembled with PRO-CREATE
00150 ;
00160 ;-----------------------------------------------------------------
00170 ;
00180 ;SVC's used:
00190 @KEY:    EQU     1
00200 @DSP     EQU     2
00210 @KEYIN   EQU     9
00220 @DSPLY   EQU     10
00230 @EXIT    EQU     22
00240 @ERROR   EQU     26
00250 @OPEN    EQU     59
00260 @CLOSE   EQU     60
00270 @LOF     EQU     64
00280 @POSN    EQU     66
00290 @READ    EQU     67
00300 @FSPEC   EQU     78
00310 @DECHEX  EQU     96
00320 @CLS     EQU     105
00330 @CKBRKC  EQU     106
00340 ;
00350 CR       EQU     0DH
00360 LF       EQU     0AH
00370 ETX      EQU     03H
00380 ;-----------------------------------------------------------------
00390 ;
00400 ;  Macro definitions:
00410 ;
00420 SVC      MACRO   #NUM            ;Perform a SVC
00430          LD      A,#NUM          ;Get SVC number
00440          RST     40              ;Process
00450          ENDM
00460 ;
00470 SHOW     MACRO   #MSG            ;Display a message
00480          LD      HL,#MSG         ;Point to message
00490          SVC     @DSPLY          ;Display it
00500          ENDM
00510 ;
00520 PROMPT   MACRO   #MSG,#LEN       ;Prompt for input
00530          SHOW    #MSG            ;Display the prompt
00540          LD      HL,INPBUF       ;Point to input buffer
00550          LD      BC,#LEN<8       ;B = input length; C=0
00560          SVC     @KEYIN          ;Get keyboard string
00570          ENDM
00580 ;
00590 MOVE     MACRO   #DEST,#SRC      ;Move from IX+#SRC to IX+#DEST
00600          LD      A,(IX+#SRC)     ;Get the byte
00610          LD      (IX+#DEST),A    ;Move it
00620          ENDM
00630 ;
00640 ;-----------------------------------------------------------------
00650 ;
00660          ORG     3000H
00670 BEGIN    SVC     @CKBRKC         ;Want out?
00680          JP      NZ,EXIT         ;Go if <BREAK> hit
00690 START    SVC     @CLS            ;Clear the screen
00700          SHOW    SIGNON          ;Opening message
00710 ;
00720 ;  Get a filespec and test it
00730 ;
00740 GETFS    PROMPT  FSPEC,23        ;Get filespec
00750          JP      C,BYE10         ;Go if <Break> hit
00760 ;
00770          LD      DE,FCB          ;Point to file control block
00780          SVC     @FSPEC          ;Set filespec in DCB
00790          JR      Z,GETLRL        ;Go if okay
00800          LD      HL,FSERROR      ;HL==> message
00810          SVC     @DSPLY          ;Show it
00820          JR      GETFS           ;Loop until legal filespec
00830 ;
00840 ;   Get logical record length from user
00850 ;
00860 GETLRL   PROMPT  LRLMSG,3        ;Get Logical Record Length
00870          JP      C,BYE10         ;Go if <Break> hit
00880          SVC     @DECHEX         ;Convert to binary
00890          LD      HL,LRLBUF       ;HL==> Buffer
00900          LD      (HL),C          ;Save LRL value
00910          XOR     A               ;A = 0
00920          OR      B               ;B = 0 ?
00930          JR      Z,OPEN          ;Go if yes
00940          SHOW    LRLERR          ;Report error if LRL>255
00950          JR      GETLRL          ;And try again
00960 ;
00970 OPEN     LD      B,C             ;LRL to B
00980          LD      HL,IOBUF        ;HL==> Sector buffer
00990          LD      DE,FCB          ;DE==> File control block
01000          SVC     @OPEN           ;Open the file
01010          JR      Z,ACTEST        ;Go if okay
01020          CP      42              ;LRL Mismatch?
01030          JR      Z,MISMAT        ;Go if yes
01040          OR      80H             ;Set error return
01050          LD      C,A             ;Error code to C
01060          SVC     @ERROR          ;Display error message
01070          JP      BYE10           ;Go if error
01080 ;
01090 MISMAT   SHOW    LRLMIS          ;Report LRL mismatch
01100          CALL    YN              ;Get yes/no response
01110          JR      NC,ACTEST       ;Go if Yes
```

Listing 1 continued

Listing 1 continued

```
01120          JP      C,BYE           ;Go if No
01130 ;
01140 ;  Does user have UPDATE access to file?
01150 ;
01160 ACTEST   LD      IX,FCB          ;IX==> file control block
01170          LD      A,(IX+0)        ;Get TYPE byte from FCB
01180          BIT     6,A             ;Is UPDATE bit set?
01190          JR      NZ,GETREC       ;Go if okay
01200          SHOW    NOACC           ;Report Access Denied
01210          JP      BYE             ;And leave
01220 ;
01230 ;  Get last record to keep
01240 ;
01250 GETREC   PROMPT  RECORD,5        ;Get record # (1-65535)
01260          JP      C,BYE           ;Go if <BREAK> hit
01270          SVC     @DECHEX         ;Convert to binary
01280          DEC     BC              ;Correct for relative 0
01290          PUSH    BC              ;Save record number
01300          LD      DE,FCB          ;DE==> File control block
01310          SVC     @LOF            ;Find last of file
01320          PUSH    BC              ;Transfer LOF
01330          POP     HL              ;    to HL
01340          POP     BC              ;Rec# to BC
01350          OR      A               ;Reset carry flag
01360          SBC     HL,BC           ;Rec# past end?
01370          JR      Z,TOOHI         ;Past end if equal
01380          JR      NC,READR        ;Okay if no carry
01390 TOOHI    SHOW    HIREC           ;Record # too high
01400          JR      GETREC          ;Get new record number
01410 ;
01420 ;  Read requested record
01430 ;
01440 READR    LD      DE,FCB          ;DE==> File control block
01450          SVC     @POSN           ;Position to record
01460          LD      HL,UREC         ;HL==> User record area
01470          SVC     @READ           ;Read file to IOBUF (& UREC if LRL<>256)
01480          LD      DE,LRLBUF       ;DE==> LRL value
01490          LD      A,(DE)          ;LRL to A
01500          OR      A               ;0 (256) ?
01510          JR      NZ,SHOWR        ;Go if not
01520          LD      HL,IOBUF        ;Else HL==> IOBUF
01530 ;
01540 ;  Show record & verify
01550 ;
01560 SHOWR    LD      B,A             ;Counter to B
01570 SHOW10   LD      A,(HL)          ;Get byte to display
01580          CP      ' '             ;Control character?
01590          JR      NC,SHOW20       ;Go if not
01600          LD      A,'.'           ;Else change to period
01610 SHOW20   LD      C,A             ;Character to C
01620          SVC     @DSP            ;Display it
01630          INC     HL              ;Point to next
01640          DJNZ    SHOW10          ;Loop to show full record
01650 ;
01660          SHOW    RIGHTR          ;Correct record?
01670          CALL    YN              ;Get yes/no response
01680          JR      NC,CHOP         ;Go if okay
01690          JR      C,GETREC        ;Else get new record number
01700 ;
01710 ;  Now chop the file
01720 ;
01730 CHOP     LD      IX,FCB          ;IX ==> file control block
01740          LD      A,(IX+1)        ;Get control byte
01750          RES     6,A             ;Turn off deallocation inhibit
01760          LD      (IX+1),A        ;Put it back
01770          MOVE    8,5             ;Move offset byte
01780          MOVE    12,10           ;NRN low ==> ERN low
01790          MOVE    13,11           ;NRN high ==> ERN high
01800 ;
01810 ;  Now close file & deallocate space
01820 ;
01830          LD      DE,FCB          ;DE==> File control block
01840 BYE      SVC     @CLOSE          ;Close the file
01850 ;
01860 ;  Clean up, and get ready to leave
01870 ;
01880 BYE10    SHOW    AGAIN           ;Run again?
01890          CALL    YN              ;Get yes/no response
01900          JP      NC,START                ;Go if yes
01910          SVC     @CKBRKC         ;Clear break bit
01920          LD      HL,0            ;Set for no error
01930 EXIT     SVC     @EXIT           ;All Done
01940 ;
01950 YN       SVC     @KEY            ;Get Y/N response
01960          AND     0DFH            ;Force to uppercase
01970          CP      'Y'             ;Was it 'Y' ?
01980          RET     Z               ;Return if yes
01990          CP      'N'             ;Was it 'N' ?
02000          JR      NZ,YN           ;Repeat if not
02010          SCF                     ;Set carry flag to show 'N'
02020          RET                     ;And return
02030 ;
02040 ; ****  Storage space  ****
02050 ;
02060 FCB      DS      32              ;File Control Block
02070 IOBUF    DS      256             ;Sector Input Buffer
02080 UREC     DS      255             ;Record buffer if LRL<256
02090 INPBUF   DS      24              ;Filespec buffer
02100 LRLBUF   DS      1               ;Logical Record Length
02110 ;
02120 ; ****  Messages  ****
02130 ;
02140 SIGNON   DB      'File Deallocation Demonstration Program',LF,CR
```

Listing 1 continued

create it. Some programs incorrectly react to that error, which is really just a warning, as they do to all other errors reported by TRSDOS: They either try the operation again or refuse to continue.

Listing 1 merely reports that the DOS has issued a warning and asks you if it is OK to continue. After the program has successfully opened a file, line 1160 checks bit 6 of the first byte of the FCB to determine whether you have provided the correct password to update the file. If not, the program reports that you don't have authority to shorten the file, then closes the file and jumps to the end.

If you can update the file, line 1250 asks for the number of the last record to retain. It then displays the contents of that record so you can verify your answer.

Finally, in line 1730, the program deallocates space from the file. First, it resets the control bit in the second byte of the FCB so that TRSDOS will update the EOF when it closes the file. Next, it changes the 3-byte pointer to the end of the file to point to the next logical record. In other words, between line 1730 and 1790, the program tricks TRSDOS into thinking that this is a sequential output file and that it should set a new EOF pointer in the directory when it closes the file. Line 1840 then closes the file and the program then asks you if it should release space from another file.

Listing 2 presents the same program in Basic. If you want, you can shorten and renumber the program, and add it as a routine to your own Basic programs.

Wrap-Up

Once you know how to trick TRSDOS into deallocating space, it makes no difference what language you use to do so as long as you can locate the FCB and change the values there. No direct facility exists in Model 4 Basic for finding the FCB, but you can use VARPTR to locate a file's buffer area. MBasic allocates 564 bytes to each file buffer. Those bytes include the FCB, the UREC, and the sector buffer.

If you want to scan through Basic's memory to look at how it handles the buffer areas, you can use Debug. At TRSDOS Ready, type DEBUG (E), hit enter, and type BASIC.BASIC.

When you ask VARPTR for the address of a file buffer, it gives you the memory address of the UREC area. Basic allocates 256 bytes to that buffer and follows it immediately with a 256-byte sector buffer. Basic also places the FCB within the same 564-byte area, but ahead of the UREC buffer; it locates the FCB 50 bytes ahead of the address that VARPTR returns.

Regardless of the record length of a Basic random-access file, the disk directory

will always show that the file has a logical record length of 256. Basic ignores TRSDOS's ability to handle files of varying record lengths and does all the necessary blocking and unblocking of files itself, probably because most of the operating systems that version 5 MBasic runs under (such as CP/M and MS-DOS) are incapable of handling variable-length records at a system level.

I've written the Basic program to parallel the Assembly-language version. Wherever possible, I've used the same line numbers and variable names. I could certainly have written the Basic program more efficiently, but the parallel structure of the two programs might help you understand how each works. I'll try to do the same in the future to help those of you who are just learning to write in Assembly language, since reading a program in two different languages seems to be one of the fastest ways to learn any new programming language.■

You can contact Hardin Brothers on CompuServe. Go PCS-117 to the Writers' and Editors' SIG and leave your message. You can also write him at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope for a reply.

Listing 1 continued

```
02150 FSPEC   DB      LF,'Filespec of record to chop ==> ',ETX
02160 FSERROR DB      LF,'Illegal filespec. Please try again',CR
02170 LRLMSG  DB      LF,'Enter Logical Record Length for this file'
02180         DB      LF,'(Enter 0 if LRL = 256)                ==> ',ETX
02190 LRLERR  DB      LF,'Illegal Logical Record Length. Please try again.',CR
02200 LRLMIS  DB      LF,'Your LRL does not match the directory LRL.'
02210         DB      LF,'Should I use your LRL anyway? ',ETX
02220 NOACC   DB      LF,'You do not have UPDATE (or higher) access to this'
02230         DB      LF,'file.  Access denied.',CR
02240 RECORD  DB      LF,'Enter the record number (1 - 65535) for last'
02250         DB      LF,'record to retain in this file.          ==> ',ETX
02260 HIREC   DB      LF,'Requested record is past end of file.'
02270         DB      LF,'Please try again.',CR
02280 RIGHTR  DB      LF,'Should this be the last record retained in the file? '
,ETX
02290 AGAIN   DB      LF,LF,'Chop another file? ',CR
02300 ;
02310         END     BEGIN
```

End

Program Listing 2. Basic version of Filechop.

```
100 '------------------------------------------------------------
110 '
120 '          Model 4 FILE-CHOP Demonstration Program
130 '          For use with BASIC 01.01.00 on TRSDOS 6.2
140 '                  Basic Version
150 '
160 '------------------------------------------------------------
170 '
350 CR$=CHR$(13)
360 GOSUB 2140    'Define display strings
670 '
            Begin main program

690 CLS
700 PRINT SIGNON$;
```

Listing 2 continued

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Listing 2 continued

```
720 '
              Get a filespec (Basic will test it at OPEN time)

740 PRINT FSPEC$;:
    LINE INPUT FSPC$
840 '
              Get logical record length & open

860 PRINT LRLMSG$;:
    INPUT LRL
920 IF LRL > 0 AND LRL <= 256 THEN GOTO 970
940 PRINT LRLERR$;
950 GOTO 860
960 '
970 EFLAG=0:
    ON ERROR GOTO 1050:
    OPEN "I",1,FSPC$:
    CLOSE:
    ON ERROR GOTO 0
975 IF EFLAG THEN GOTO 1040
1000 IF LRL<256 THEN OPEN "R",1,FSPC$,LRL ELSE OPEN"r",1,FSPC$
1010 GOTO 1250
1040 '
            Trap for filename that does not exist

1050 PRINT "File does not exist"
1060 EFLAG = -1
1070 RESUME NEXT
1230 '
              Get last record to keep

1250 PRINT RECORD$;:
     INPUT BC
1310 HL = LOF(1)
1380 IF BC<=HL THEN GOTO 1470
1390 PRINT HIREC$;
1400 GOTO 1250
1420 '
            Read requested record

1460 HL=VARPTR(#1)
1470 GET 1,BC
1540 '
              Show record and verify

1560 B = LRL
1570 FOR Z = 0 TO B-1:
       A=PEEK(HL)
1590     IF A<ASC(" ") THEN A=ASC(".")
1610     PRINT CHR$(A);
1630 HL=HL+1
1640 NEXT Z
1650 '
1660 PRINT RIGHTR$;
1670 GOSUB 1940
1680 IF X$="Y" THEN GOTO 1730
1690 IF X$="N" THEN GOTO 1250
1710 '
              Now chop the file

1730 IX = VARPTR(#1)-50
1740 A = PEEK(IX+1)
1750 A = (A AND 191)
1760 POKE (IX+1),A
1770 POKE IX+8, PEEK(IX+5)
1780 POKE IX+12, PEEK(IX+10)
1790 POKE IX+13, PEEK(IX+11)
1810 '
              Close file and deallocate space

1840 CLOSE
1860 '
              Clean up, and get ready to leave

1880 PRINT AGAIN$;
1890 GOSUB 1940
1900 IF X$="Y" THEN GOTO 690
1910 PRINT "Program successfully completed"
1920 GOTO 2310
1930 '
       Yes/No routine

1940 X$=INPUT$(1)
1950 X$=CHR$(ASC(X$) AND &HDF)
1960 IF X$="Y" THEN RETURN
1980 IF X$<> "N" THEN GOTO 1940
2020 RETURN
2120 '
               Messages

2140 SIGNON$ = "File Deallocation Demonstration Program"+CR$+CR$
2150 FSPEC$  = CR$+"Filespec of file to chop ==> "
2170 LRLMSG$ = CR$+"Enter Logical Record Length for this file"
              +CR$+"(Possible values: 1 - 256)                ==> "
2190 LRLERR$ = CR$ + "Illegal Logical Record Length. Please try again." + CR$
2240 RECORD$ = CR$ + "Enter the record number (1 - 65535) for last "
              +CR$ + "record to retain in this file.            ==> "
2260 HIREC$  = CR$ + "Requested record is past end of file."
              +CR$ + "Please try again." + CR$
2280 RIGHTR$ = CR$ + "Should this be the last record retained in the file? "
2290 AGAIN$  = CR$ + CR$ + "Chop another file? "+ CR$
2291 RETURN
2300 '
2310 END
```

End

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Deep in the Heart of Taxes

by R. E. Reinecke

How many times a year do you try to estimate your federal income tax bill? Do you wonder whether you or Uncle Sam would gain more if you earned extra income? Here's a set of three easily customized Multiplan templates that keep track of your income and deductions; they also calculate the impact of income changes on your tax bill (see Figs. 1–3). In the end, you'll get a running estimate of your federal tax so you won't get a nasty shock when tax time rolls around.

The templates illustrate some of Multiplan's great features: linked sheets, tables, if. . .then calculations, and named cells. Cell names appear in upper- and lowercase with no spaces; for example, ProbableFedTax is the cell where Multiplan reports your probable federal tax. This makes it easy to understand what's happening within a sheet.

Three Sheets

TaxEst85, shown in Fig. 1, is a dependent sheet that collects data from supporting sheets Travel85 and TaxDed85, shown in Figs. 2 and 3. You can add supporting sheets as needed. The eXternal Link command connects the dependent sheet to the supporting sheets.

When you load TaxEst85, Multiplan automatically goes to Travel85 and copies the contents of the cell named TravelExpense. Similarly, it copies the contents of the cell NonPayrollDed from the TaxDed85 sheet. This way, whenever you update either template, Multiplan uses the new data to compute your probable tax.

TaxEst85 contains the income and payroll deductions that reduce your paycheck to almost enough to live on. I've shortened Fig. 1 to save space; your sheet should contain your estimated income for an entire year. If you're a wage earner, that means copying the figures from your pay stub as many times as you expect to be paid. You can adjust the sheet to show extra income or changes in periodic income as they occur.

This sheet also contains an abbreviated federal tax table, copied from the latest Internal Revenue Service (IRS) instruction booklet. You can easily update the tables to reflect changes in income tax rates.

The summarizing and estimating part of TaxEst85 takes place at the top of the sheet. GrossIncome minus AllowedDeductions equals TaxableIncome. Multiplan looks up TaxableIncome in the FederalTaxTable to find ProbableFedTax. This figure, deducted from FedWithHeld (total federal tax withheld), equals DueIRS, the amount you owe the government. A negative value for DueIRS means you get a refund.

The calculation for AllowedDeductions (see Fig. 1) uses Multiplan's if. . .then function. The formula is:

```
If ((PayrollDed + NonPayrollDed) > 2300,
   PayrollDed + NonPayrollDed) - 2300, 0)
```

This formidable expression simply means

If all your deductions are greater than $2,300
Then AllowedDed is all your deductions minus $2,300
Else your AllowedDed is zero.

You remember? The IRS allows only deductions that total more than $2,300.

Figures 4, 5, and 6 describe the templates' cells and formulas. Relative formulas appear within brackets; Multiplan adjusts them when you add new rows.

The Extra Income line of TaxEst85 is where you play "what-if." What if you earn $5,000 at a second job? What if you sell that stock and take a $1,000 loss? Multiplan immediately shows the effect on ProbableFedTax and calculates a new value for DueIRS. After calculating hypothetical taxes, you should blank out the cells in the Extra Income line and preserve your basic data.

Fine Tuning

You can customize the supporting sheets or add supporting sheets as you

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Illustration by Vinoy Laughner

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want. If you have an active stock portfolio, you could eXternally link a sheet called Stocks85 that passes a StockGainLoss value to TaxEst85.

If you travel extensively, you might have to change the formula for TravelDeduction to reflect the IRS's reduced allowance for miles driven beyond about 15,000 miles.

As the year progresses, you'll have to add rows to the templates. Multiplan's Insert command makes it easy to do so, but newly inserted rows aren't formatted. To get around this, you can set up each sheet with a section labeled Blank Lines, which contains three properly formatted lines named BlankLines. Move the cursor to the spot in column 1 where you want to insert rows—R10 C1 in Fig. 2, for example. Then insert three rows, move the cursor up to R10 C1 again, and copy from BlankLines. Now you have room for more data and Multiplan has adjusted all formulas to take the new rows into account.

Watch It

You should keep in mind that these templates won't do your tax return nor will they serve as a tax advisor. They will, however, give you a convenient way to record your income and deductions, and help you predict how your tax return's bottom line will look.■

You can write to R. E. Reinecke at P.O. Box 183, Kutztown, PA 19530.

Send your templates or spreadsheet tips to Spreadsheet Beat, 80 Micro, 80 Pine St., Peterborough, NH 03458. We'll pay $50 for each one we publish.

```
     1       2         3         4         5         6         7         8         9         10
 1       INCOME TAX ESTIMATOR
 2       ====================
 3
 4                                          ..... ADJUSTMENTS .....   ..... DEDUCTIONS .....
 5         $30500.00 Gross Income             $3000.00 Dependent Allowance    $4220.00 Payroll Ded
 6         $24117.82 Taxable Income            $106.78 Travel Expense         $1355.40 Non Payroll Ded.
 7
 8          $4423.00 Probable Fed Tax                                         $3275.40 Allowed Ded.
 9 =====)    $823.00 DUE IRS
10
11 ************************************************************************************************************
12
13 Date                                  Fed       State      Local      Union     Charity
14 MM/DD    Source          Gross      Withheld   Withheld   Withheld    Dues     Withheld
15 ========================================================================================================
16 Extra Income ? ....
17 --------------------------------------------------------------------------------------------------------
18
19 12/30 Paycheck        $7000.00     $900.00    $160.00     $80.00    $160.00     $40.00
20 11/29 Paycheck        $7000.00     $900.00    $160.00     $80.00    $160.00     $40.00
21  3/30 Stock Sale      $2500.00                                                  $2500.00
22  2/10 Paycheck        $7000.00     $900.00    $160.00     $60.00    $160.00     $40.00
23  1/01 Paycheck        $7000.00     $900.00    $160.00     $60.00    $160.00     $40.00
24 ========================================================================================================
25                      $30500.00    $3600.00    $640.00    $280.00    $640.00   $2660.00
26
27
28
29       BlankLine 3
30       BlankLine 2
31       BlankLine 1
32
33       Federal Tax Table-------
34            Income        Tax
35               $0.00     $3472.00
36           $21000.00     $3602.00
37           $21500.00     $3732.00
38           $22000.00     $3862.00
39           $22500.00     $3992.00
40           $23000.00     $4132.00
41           $23500.00     $4273.00
42           $24000.00     $4423.00
43           $24500.00     $4573.00
44           $25000.00     $4723.00
45           $25500.00     $4873.00
46           $26000.00     $5023.00
```

Figure 1. TaxEst85.

$$

```
    1    2    3              4            5   6    7     8             9
 1 1985 TRAVEL EXPENSES
 2 ====================
 3                                  $0.22 Allowance per mile
 4                                    482 MilesDriven
 5                                  $0.85 CashOutlay
 6
 7                                $106.78 TravelExpense (Total)
 8
 9 Miles Date  Costs   Reason                 ! Miles  Date  Costs   Reason
10 ================================================================================
11                                           !
12   65  5/21         Printer to repair shop  !
13   15  4/13         Second Job              !    50  4/14         Levine's Atown
14   15  4/06         Second Job              !    50  4/06         CLT Projections
15    1  2/12         Maintenance             !     2  2/14         Maintenance & Hdwr
16    2  2/08         Maintenance & Hdwr      !    15  2/10         Second Job
17   15  2/02         Second Job              !   140  2/07   $0.85 To McManus - buy Paint
18   15  1/20         Second Job              !   1.5  1/23         To Maintenance etc
19   50  1/08         Donate Blood            !    15  1/19         Second Job
20   15  1/05         Second Job              !    15  1/06         Second Job
21 ================================================================================
22
23                    BlankLine3             !
24                    BlankLine2             !
25                    BlankLine1             !
```

Figure 2. Travel85.

```
     1       2         3         4         5         6         7         8         9
 1                1985 NON PAYROLL TAX DEDUCTIONS
 2                ===============================
 3
 4                  $1,355.40  NonPayrollDed
 5
 6         How     Categories. . . . . .
 7 Date    Paid      Business     Charity    Hardware    Software  Explanation
 8 ------------------------------------------------------------------------------
 9
10  5/21  CK586        $15.90                                      DMP2100 Maintenance
11  5/03  CK580        $29.58                                      INFOWORLD Subscrptn
12  4/14  CA028                    $6.72                           Enemy Fabric
13  1/28  CK559        $23.19                                      Book Purchase
14  2/13  VS018                                $1,017.00           Hard Disk Drive
15  3/28  CA017                    $4.22                           Wire Ties for LT
16  4/01  CK550                                            $68.00  Omniterm
17  2/21  VS016                                $33.00              TRSDOS Hardisk Drivers
18  3/20  CA015                    $4.80                           CLT Blueprints
19  2/18  VS014                                            $137.75 LDOS Operating System
20  3/20  CA012                   $13.25                           Prop for Enemy
21 01/08  CA002        $1.99                                       Lunch for client
22 ==============================================================================
23        Totals      $70.66      $28.99    $1,050.00     $205.75
24
25                                                                 BlankLine 3
26                                                                 BlankLine 2
27                                                                 BlankLine 1
```

Figure 3. TaxDed85.

Cell	Name	Description
R25 C3	GrossIncome	Gross Income
R25 C4	FedWithHeld	Federal income tax withheld
R25 C5	StateWithHeld	State tax withheld
R25 C6	LocalWithHeld	Local tax withheld
R25 C7	UnionDues	Union dues withheld
R25 C8	CharityWithHeld	Charitable deductions withheld
Formula for each cell: SUM (R[– 2]C:R[– 9]C)		
R5 C8	PayrollDed	Sum of all payroll deductions
Formula: StateWithHeld + LocalWithHeld + UnionDues + CharityWithHeld		
R8 C8	AllowedDeductions	Allowable deductions total
Formula:	IF((PayrollDed + NonPayrollDed) > 2300, PayrollDed + NonPayrollDed – 2300, 0)	
R6 C2	TaxableIncome	Taxable Income
Formula: GrossIncome-DependentAllowance-TravelExpense-AllowedDed		
R8 C2	ProbableFedTax	Probable federal tax
Formula:	Lookup (TaxableIncome, FederalTaxTable)	
R9 C2	DueIRS	Amount owed IRS Formula: ProbableFedTax - FedWithHeld

Figure 4. Cells and formulas for TaxEst85.

Cell	Name	Description
R4 C4	MilesDriven	Sum of both mileage columns
Formula: SUM (R[+ 7]C[– 3]:R[+ 16]C[– 3]) + SUM (R[+ 7]C[+ 2]:R[+ 16]C[+ 2])		
R5 C4	CashOutlay	Sum of both cash columns
Formula: SUM (R[+ 6]C[– 1]:R[+ 16]C[– 1] + SUM (R[+ 6]C[+ 4]:R[+ 16]C[+ 4])		

Figure 5. Cells and formulas for Travel 85.

Cell	Name	Description
R23 C3	Business	Sum of all business expenses
R23 C4	Charity	Sum of all charitable contributions
R23 C5	Hardware	Sum of all hardware purchases
R23 C6	Software	Sum of all software purchases
Formula for each cell: SUM (R[-2]C:R[-14]C)		
R4 C3	NonPayrollDed	Sum of all nonpayroll deductions
Formula: Business + Charity + Hardware + Software		

Figure 6. Cells and formulas for TaxDed85.

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Continued from p. 36

cation, and unhooking the piece by pressing the spacebar again. If you try to move a piece illegally, the program flashes an "Illegal move" message until you make a correct move. If you become bored during the course of a game, you can put the computer in automatic mode and watch it play itself.

You track your moves in either algebraic or descriptive notation. The right side of the screen displays status information on game level, number of moves, search level, and other information.

Tournament Chess allows the standard chess moves, including castling, capturing en passant, and pawn promotion. You can clock a game according to tournament timing or rapid transit timing, and change the time clock to desired values.

The game includes options to review the game in forward or backward directions, change the clock time, change the flash count to indicate the piece the computer moves, change cursor speed, review game history, swap sides, set wake-up buzzer, midgame zeal, and others.

Chess Classics

Chess Classics contains 64 of the best games from the history of international chess competition. It puts you in the role of partner to the person actually playing an opponent; you try to figure out the moves your partner will make to win a game. This concept teaches you to play better by learning from your own mistakes.

Chess Classics plays at higher levels than other games and responds immediately to moves. It also checks for valid moves. Noteworthy Software recommends that you set up a chess board beside the computer to make understanding the game easier.

I tried both the King Pawn and the Queen Pawn disks, both displayed in low-resolution graphics only. After King Pawn displays its title screen, you choose from eight opening games or let the program select the opening for you. You can either scan a game, which moves the pieces when you press the enter key, or play a game.

Options let you display algebraic location descriptions of each square, play both sides during the game's opening to see the different moves, select the number of wrong moves before the computer reveals the correct one, and select token color.

You enter moves in algebraic chess notation. Chess Classics supports features like castling, capture en passant, and queening a pawn. If you need to quit before you finish a game, you can save the game for later play.

The manual is small and it was unclear on how to actually start a game. Still, this package helps you learn chess by learning game-playing concepts.■

Kid's Stuff: A Health Guide for Children

by Wynne Keller

★★★★☆

The Home Health Guide for Children runs on the Model III (48K) and requires two disk drives. Clinical Reference Systems Inc., P.O. Box 20308, Denver, CO 80220. $49.95.

Easy to use: ★★★★☆
Good docs: ★★★★★
Bug free: ★★★★★
Does the job: ★★★★☆

The Home Health Guide for Children is a computerized data base that catalogues childhood illnesses and injuries and suggests methods of treatment. Dr. Barton Schmitt, an associate professor of pediatrics at the University of Colorado Medical School, compiled the information in the Health Guide. The Guide's advice is easy to understand and informative, but it could use a more efficient system for disk-swapping.

The Guide is organized in a tree structure, so you can move from general categories to specific illnesses.

Using the Guide

The Home Health Guide comes on three disks, which you can back up only once. The manual is a 15-page booklet, but really isn't necessary since on-screen help is available.

The three disks are labelled A–C. The A disk remains in drive zero at all times, while you swap disks B and C into drive 1 to access different parts of the data base as needed. One problem is that the manual's index doesn't indicate which items are on disk B or C, making it likely to inadvertently put in the wrong disk. It would be better if the index listed which topics are on which disk.

The data is organized in a tree structure, so you can move from general categories to more specific illnesses. You can find items from the index, where the detailed listings occur (rubella, canker sores, and so on), or you can use the table of contents, which divides information by body part (skin, lungs, and so on). The Home Health Guide also lists the most common health problems of childhood by category (injuries, infections, and so on), and has a separate section on emergencies.

Each topic describes the illness's symptoms and divides them into three categories: call a physician immediately, arrange to see a doctor during office hours, and home care. The text cross-references symptoms that may indicate a different illness, common mistakes in treating the illness, and prevention, if applicable.

The computer maintains a history of each session, so you can review what questions you asked in case you need to go back over something. The history resides in memory, not on disk.

While I was reviewing the program, my son came in from playing in the snow with a white patch on his skin. Since I thought it might be frostbite, I went to the table of contents and selected "Skin."

The next screen offered three choices: "Rashes widespread," "Rashes localized," or "No rash." I selected "No rash." The list of specific conditions on the next screen included frostbite. I changed the disk in drive 1 and read the frostbite information.

This particular situation was not an emergency, and the program provided me with the information I needed quickly and easily.

In a life-threatening emergency, you wouldn't have time to consult a computer (or a book for that matter). You need some knowledge of emergency procedure before emergencies occur. With this in mind, you should read the information in the emergency sections to learn what to do. Direct pressure is discussed in the wounds category and the Heimlich maneuver in the choking section.

One thing that bothered me was the Guide's advice to do mouth-to-mouth breathing "if you know how." I feel that mouth-to-mouth resuscitation is simple enough to describe, and should have been included.

Conclusion

The Home Health Guide for Children provides complete and useful information quickly and easily. The branching structure makes it easier to use than a book, because you can go from general categories to more specific selections until you find the correct information. With a book index, you might have to look up a number of references to find the right one. Since this convenience does have a higher price tag than a book, you'll have to decide whether it's worth the extra money.■

Scanned by Ira Goldklang - www.trs-80.com

Total Learning System

★★★★

Total Learning System runs on the Tandy 1000/1200/2000 (128K) and requires one disk drive. Total Learning Systems Inc., 2005 W. Cypress Creek Road #4, Fort Lauderdale, FL 33309, 305-771-2100. $39.95.

If you have just bought a Tandy 1000 and have no idea what to do with it, the Total Learning System will get you started. This program assumes that you know next to nothing about your computer and need to learn the absolute basics.

The tutorial starts by asking questions about your computer system, such as your type of monitor (RGB or monochrome) and the number of drives. It then displays a main menu of 10 selections covering different aspects of computer use. The entire tutorial is menu-driven and uses graphics and sound to enhance the lessons.

The first selection is a show-and-tell of the capabilities of your computer. It illustrates the different parts of the computer, what they are, and how they interact with each other.

Topics include using the keyboard, disk-handling procedures, and the disk operating system. Ancillary diagrams and text illustrate the computer's different parts. The Total Learning System details how you boot up DOS and what constitutes a bootable and nonbootable disk.

Other topics include changing the default drive, formatting disks, copying files, and understanding directory entries. The Total Learning System also discusses wildcard characters with examples for both directory and disk copy commands.

One important topic the Total Learning System covers is MS-DOS's tree structure for subdirectories and paths. Examples help you understand this somewhat confusing concept.

The Total Learning System also discusses a few commands contained in the DOS manual that can assist you in interpreting this mysterious command structure.

The last category discusses the importance of exiting a program correctly. An improper exit can easily crash a disk and the tutorial outlines the proper procedures for any type of program.

While the Total Learning System is small, it's to the point. It's primarily for someone just starting out with MS-DOS. A nice added feature lets you read a summary on the more important topics instead of having to go through the entire lesson, which is good for refreshing your memory.

I was impressed with the program's detail, and the way it uses color graphics and sound to make the tutorial interesting and enjoyable.

Many topics provide user interaction, requiring responses and input. If you are new to MS-DOS, this program can help you learn your machine more effectively than wasting valuable time struggling with the manual.

—David Engelhardt

Learning Basic for The Tandy 1000/ 2000

★★★★

Learning Basic for the Tandy 1000/ 2000. David A. Lien. Softcover, 496 pp. Compusoft Publishing, 535 Broadway, El Cajon, CA 92021. Radio Shack catalog number 25-1500. $19.95.

David Lien's newest book for Tandy, *Learning Basic for the Tandy 1000/ 2000*, isn't for advanced programmers, but it's a good tutorial for the beginning computerist. It takes you step by logical step through MS-DOS GW-Basic, with clear and easy-to-follow examples. In fact, a novice with a new Tandy computer could sit down and start using the machine with the guidance of Lien's book. After two brief chapters, you've powered up the machine, learned some essential DOS commands, and written a small Basic program.

Lien has a light style and the brief lessons make Basic more palatable. The exercises provided help those who take the time. The humor isn't really funny, but it's bearable at least, and relevant to the subject matter.

If you read through the book, you'll have a solid knowledge of Basic and the 1000/2000. Unfortunately, the book's format precludes its use as a reference. And since *Learning Basic* doesn't cover advanced areas like color graphics or Tandy's new event-trapping statements, sophisticated users will have to look elsewhere for their information. The book's appendixes cover ASCII code, reserved words, error message tables, and a sample sequential file program.

The book offers many helpful tricks, along with insights even for experienced users who take the time to read it. I found useful information I had long forgotten.

It's been said that Lien has written the same book over and over again. I disagree. A lot of thought and research went into tailoring this book to Tandy's MS-DOS machines. Lien's knowledge of Basic on these new computers is thorough and he passes it on effectively.

—Dave Rowell

T/Maker 4.03

★★★★

T/Maker (version 4.03) runs on the Model 4/4P (64K) with two disk drives and on the Tandy 1000/1200/2000 (128K) with one disk drive. T/Maker Co., 2115 Landings Drive, Mountain View, CA 94043, 415-962-0195. $299 for TRSDOS version, $450 for MS-DOS version.

T/Maker is an integrated word processor/spreadsheet/data base program whose component parts work together seamlessly. All the different modules use the same command structure as you move from one application to the next. While this makes T/Maker easy to learn, it's at the price of some functionality.

T/Maker's documentation has always been its strong point and there is lots of it. With over 400 pages of text and two reference booklets, you may feel overwhelmed. But the documentation helps you learn the T/Maker system thoroughly, and it eases you into the various functions.

This latest version of the package has been reorganized into a more logical flow, with the tutorial now following the introduction (unlike previous versions) and a separate "Getting Started" booklet that familiarizes you with the T/Maker system and command structure.

Another difference is the addition of various features. T/Maker now comes with various templates (screens) useful to almost any business. These templates cover checkbook; purchase order; invoice/sales; address book; inventory management; stock portfolio; time management; student, patient, and personnel records; and property management programs. You can modify the templates to suit your needs.

Other additions to the T/Maker system include a data encryption mode, and new chapters on list processing, designing systems, and transfer utilities.

T/Maker is still unwieldy when used on a Model 4/4P under TRSDOS 6.2 if you only have single-sided drives. But it doesn't exhibit any problems with type-ahead, as it did under CP/M. T/Maker still uses too many disks (four in all), and you have to be careful about which ones you're supposed to have in drive zero and drive 1. It is much easier to handle on the Tandy 1000, where there are only two disks, and you usually use just one.

As an all-in-one package for TRSDOS users, T/Maker's an impressive program. But you quickly tire of its limitations on a standard Model 4/4P. You

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Tidbit #28

Here are some PEEKs and POKEs to add to your repertoire of programming tricks. The Table describes some useful POKEs; the POKE command's format is POKE X,Y where X is a decimal address and Y the value to POKE into that address.

The POKE command's companion, PEEK, lets you see the decimal representation of the code at the PEEK location. For example, A = PEEK(16537) stores the ASCII code of the last key pressed in the variable A. The command PRINT A prints the ASCII number of the last key you pressed.

Another useful PEEK address that monitors the control keys is 14400. This location contains the following numbers when you press the corresponding key: Enter—1, Clear—2, Down arrow—8, Up arrow—16, Left arrow—32, Right arrow—64, Spacebar—128.

You can use PEEK to check the value contained in any ROM location. Just type in ?PEEK(X) where X is the desired PEEK location. The question mark is shorthand for the Print command.

Martin Dilkhoff
Huntingburg, IN

Address	Value	Function
16396	23	Hangs up the computer when you press the break key.
16404	0	Stabilizes the cursor, freezes TIME$, and gives better quality sound. Restore with POKE 16404,48.
16406	28	Shuts out keyboard interruption (break/shift-@).
16409	0	Sets caps switch to lowercase letters.
16409	1	Sets caps switch to uppercase letters.
16410	0	Stops cursor blink for eight seconds.
16412	0	Starts cursor blink.
16412	1	Stops cursor blink.
16419	X	X = zero to 255; changes the cursor to CHR$(X). For a normal cursor, X = 176.
16427	X	Sets line print width to X characters.
16916	X	X = zero to 7; scroll-protects top X lines of screen.
16919	X	X = zero to 59; sets seconds on TIME$ clock.
16920	X	X = zero to 59; sets minutes on TIME$ clock.
16921	X	X = zero to 12; sets hour on TIME$ clock.
16922	X	X = zero to 99; sets year on TIME$ clock.
16923	X	X = zero to 31; sets day on TIME$ clock.
16924	X	X = 1–12; sets month on TIME$ clock.
16863	196	and
16864	114	and
16865	0	Garbles the listing of a program so you can't read it, although the program runs properly.

Table. Some sample POKEs and their functions.

really need high-capacity drives (or a hard disk) and 128K to give you some breathing room.

It also makes a good jack-of-all-trades program for the Tandy 1000, although its somewhat steep price may deter some users from taking the plunge. While you could buy stand-alone packages for what you would spend on T/Maker, you wouldn't have its integration. Ultimately, you have to decide whether that price is worth it.

—Ryan Davis-Wright

MLink Communications System

★★★½

MLink Data Communications System runs on the Model 4/4P (64K) under CP/M, and on the Tandy 1000/1200/2000 (128K). Corporate Microsystems Inc., P.O. Box 277, Etna, NH 03750, 603-448-5193. $250.

The MLink Data Communications System isn't your average communication program. You can use it as a terminal emulator, a directory-based autodialer, an automatic log-on facility, an error-free data transfer utility, a remote bulletin board, an electronic mail system, or the heart of of a distributed data processing system.

MLink starts innocently enough, with instructions on how to view the program's list of commands. After that, it gets complicated. Each letter on the command list brings up yet another menu, allowing you to auto-dial a number, configure the software, identify your modem characteristics, and perform other functions.

If you're using a Hayes Smartmodem, a Novation Smartcat, or any of the other five supported modems, you can move right into the program and begin telecommunicating. If MLink doesn't support your modem, you have some work to do.

MLink uses a program called the script compiler, which is actually a limited programming language used to configure MLink for auto-dialing remote systems and using smart modems other than the ones already listed. According to Corporate Microsystems, the script compiler is the real power behind the whole system. By compiling macros that MLink can call, you can customize the program to your specific telecommunications needs.

The documentation is extensive (over 200 pages), and comes in a three-ring binder conveniently separated into sections so you can locate specific information after becoming familiar with the program. MLink's documentation follows the same experienced-users-only characteristic shown by the software. You'll find very little hand-holding, though the instructions provided are clear and accurate. Appendixes and tables at the rear of the documentation are helpful and you can use them as a guide in customizing the software.

MLink's MS-DOS versions come on two double-sided disks, with the CP/M version on three floppies. You won't need all the files on all the disks once you configure the system, so the inconvenience of using so many disks is soon behind you.

MLink isn't the kind of telecommunications program a beginner would want as a starter package. It's a sophisticated and complex program that requires study and experience in telecommunications and programming. Computerists with those qualifications will find MLink a step above the standard micro terminal emulators. But for the casual computer user who only wants to check in on the local bulletin board or CompuServe, MLink is a bit heavy-handed.

—Bradford N. Dixon

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Listing continued from p. 66

```
01640           LD      HL,(OLDMEM)     ;HL=OLD HIGH$
01650           SBC     HL,BC           ;HL-> NEW HIGH$
01660           LD      A,HIGH
01670           LD      B,00H           ;SET HIGH$ OPR
01680           RST     28H
01690           INC     HL              ;HL-> RELO FENTRY
01700           LD      (IX+1),L
01710           LD      (IX+2),H        ;SET MODDCB TO FLT
01720           POP     DE              ;DE=FENTRY=SOURCE
01730           PUSH    DE              ;SAVE IT
01740           PUSH    HL              ;SAVE NEW FENTRY
01750           OR      A
01760           SBC     HL,DE           ;HL= OFFSET
01770           LD      B,H
01780           LD      C,L             ;BC=OFFSET
01790           LD      IX,RELTAB       ;IX-> RELO TABLE
01800 RELOOP    LD      L,(IX+0)        ;GET LSB ADDR
01810           LD      H,(IX+1)        ;HL= RELO ADDR
01820           LD      A,H
01830           OR      L
01840           JP      Z,RELXIT        ;Z= END OF TABLE
01850           LD      E,(HL)          ;GET LSB
01860           INC     HL
01870           LD      D,(HL)          ;GET MSB
01880           EX      DE,HL           ;SWAP FOR CALC
01890           ADD     HL,BC           ;HL= RELO ADDR
01900           EX      DE,HL           ;SWAP BACK
01910           LD      (HL),D
01920           DEC     HL
01930           LD      (HL),E          ;SAVE RELO ADDR
01940           INC     IX
01950           INC     IX              ;IX-> NEXT VECTOR
01960           JR      RELOOP          ;LOOP
01970 ;
01980 ;
01990 ;
02000 INITF     LD      HL,$-$          ;HL-> PARAM STRING
02010 FILNAM    EQU     $-2             ;STUFFED BY @PARAM
02020           LD      A,(FILRSP)      ;GET RESPONSE BYTE
02030           AND     1FH             ;LOWER 5 BITS ONLY
02040           RET     Z               ;Z= NO FILESPEC
02050           LD      C,A             ;
02060           LD      B,0             ;BC= FILENAME LENGTH
02070           LD      DE,BUFFER       ;DE-> BUFFER AREA
02080           PUSH    DE
02090           LDIR                    ;MOVE FSPEC
02100           EX      DE,HL           ;HL-> END OF FSPEC
02110           LD      (HL),0DH        ;FLAG END
02120           POP     HL              ;HL-> BUFFER START
02130           LD      DE,FCB1         ;DE-> FCB
02140           LD      A,FSPEC         ;@FSPEC
02150           RST     28H             ;MOVE & VERF FSPEC
02160           JR      Z,FSPOK         ;Z=OK
02170           LD      HL,BADFIL       ;HL-> "BAD FILE" MSG
02180           JP      LOGERR          ;GOTO LOG ERROR
02190 ;
02200 FSPOK     LD      HL,FKFTXT       ;HL-> DEFAULT EXTENSION
02210           LD      A,FEXT          ;SVC
02220           RST     28H             ;ADD EXTENSION
02230 ;
02240           LD      HL,BUFFER       ;HL-> DISK I/O BUFFER
02250           LD      B,00H           ;LRL= 256
02260           LD      A,OPEN          ;SVC
02270           RST     28H
02280           JP      NZ,ERR
02290           LD      DE,F1           ;DE-> STRING BUFFER
02300           LD      HL,VECTAB       ;HL-> VECTOR TABLE
02310           LD      B,06H           ;SIX STRINGS ONLY
02320 RDLP1     CALL    SETPTR          ;SET A VECTOR
02330 RDLP2     PUSH    DE              ;SAVE THIS PTR
02340           LD      DE,FCB1         ;DE-> FCB
02350           LD      A,GET           ;GET A BYTE
02360           RST     28H
02370           POP     DE              ;DE-> BUFFER
02380           JR      NZ,EOF          ;NZ= ERROR
02390           LD      (DE),A          ;ELSE SAVE BYTE
02400           INC     DE              ;BUMP PTR
02410           CP      0DH             ;END OF LINE?
02420           JR      NZ,RDLP2        ;IF NOT
02430           DJNZ    RDLP1           ;LOOP FOR 6 LINES
02440           JR      EOFOK           ;END OF FILE
02450 ;
02460 SETPTR    LD      (HL),E          ;SAVE LSB OF LINE PTR
02470           INC     HL              ;HL-> MSB LOC
02480           LD      (HL),D          ;SAVE MSB
02490           INC     HL              ;HL-> NEXT LSB
02500           RET
02510 ;
02520 ;
02530 ;
02540 EOF       CP      1CH             ;ERROR = EOF ?
02550           JP      NZ,ERR          ;IF NOT
02560 SETLOP    LD      A,0DH           ;CR
02570           LD      (DE),A          ;FLAG END OF LINE
02580           CALL    SETPTR          ;SET PTR
02590           INC     DE              ;DE-> NEXT BUFFER
02600           DJNZ    SETLOP          ;LOOP THRU REMAINING
02610 ;
02620 EOFOK     LD      (LSTPTR),DE     ;SAVE EOFLT PTR
02630           LD      DE,FCB1         ;DE-> FCB
02640           LD      A,CLOSE         ;SVC
02650           RST     28H
02660           JP      NZ,ERR
02670           INC     A
02680           INC     A               ;SET NZ STATUS
02690           RET
02700 ;
02710 ;
02720 BADFIL    DEFM    'Invalid filespec!'
02730           DEFB    0DH
02750 FKFTXT    DEFM    'FKF'
02760 ;
02770 RELTAB    DEFW    REL0
02780           DEFW    REL1
02790           DEFW    REL2
02800           DEFW    REL3
02810           DEFW    REL4
02820           DEFW    REL5
02830           DEFW    REL6
02840           DEFW    REL7
02850           DEFW    REL8
02860           DEFW    REL9
02870           DEFW    RELA
02880           DEFW    RELB
02890           DEFW    RELC
02900           DEFW    RELD
02910           DEFW    RELE
02920           DEFW    RELF
02930           DEFW    REL10
02940 LSTREL    DEFW    REL11
02950           DEFW    REL12
02960           DEFW    REL13
02970           DEFW    REL14
02980           DEFW    REL15
02990           DEFW    REL16
03000           DEFW    REL17
03010           DEFW    REL18
03020           DEFW    REL19
03030           DEFW    REL1A
03040           DEFW    REL1B
03050           DEFW    REL1C
03060           DEFW    REL1D
03070           DEFW    REL1E
03080           DEFW    REL1F
03090           DEFW    REL20
03100           DEFW    REL21
```

Listing continued

Listing continued

```
03110           REL22
03120           REL23
03130           REL24
03140           REL25
03150 ;
03160 ;         EQU     0000H
03170 ;
03180 ;
03190 RELXIT    POP     DE                      ;GET DEST
03200           POP     HL                      ;GET SOURCE
03210           POP     BC                      ;GET LENGTH
03220           LDIR                            ;MOVE FILTER
03230           RET                             ;DONE
03240 ;
03250 ;
03260 INITC     LD      HL,VECTAB               ;HL-> VECTOR TABLE
03270           LD      DE,DEFVEC               ;DE-> DEFAULT VECS
03280           LD      BC,12                   ;12 BYTES TO MOVE
03290           LDIR                            ;MOVE THEM
03300           RET                             ;DONE
03310 ;
03320 ;
03330 DSPMSG    PUSH    DE                      ;SAVE DE
03340           LD      A,DSPLY                 ;SVC, DISPLAY MSG @ (HL)
03350           RST     28H
03360           POP     DE
03370           RET                             ;Z= O.K.
03380           LD      L,A                     ;L= ERROR CODE
03390           LD      H,00H
03400           OR      0CH                     ;SET RETURN BITS
03410 ERR       LD      C,A                     ;PASS IN "C"
03420           LD      A,ERROR                 ;SVC, LOG AN ERROR
03430           RST     28H
03440           JR      DOSXIT                  ;RET W/ ERROR
03450 ;
03460 ;
03470 PRMERR    LD      HL,PRMMSG               ;HL-> "PARAMETER ERR"
03480           DEFB    0DDH                    ;MASK TO OUTPUT
03490 NOTSET    LD      HL,SETMSG               ;HL-> "MUST INSTALL SET"
03500           DEFB    0DDH                    ;MASK TO OUTPUT CODE
03510 NOMEM     LD      HL,MEMMSG               ;HL-> "NO MEMORY SPACE"
03520 LOGERR    LD      A,LOGOT                 ;SVC, DISPLAY & LOG MSG
03530           RST     28H
03540           LD      HL,0FFFFH               ;SET ERROR RETURN
03550 DOSXIT    LD      SP,$-$                  ;RESET SP
03560 OLDSP     EQU     $-2
03570           RET                             ;GOTO DOS READY
03600 PRMMSG    DEFM    'Parameter ERROR!'
03610           DEFB    0DH
03620 SETMSG    DEFM    'Must install via SET!'
03630           DEFB    0DH
03640 MEMMSG    DEFM    'No memory space available!'
03650           DEFB    0DH
03660 BANNER    DEFM    'PF/FLT - Model 4 function key filter - Version 3.2 -'
03670           DEFM    ' (c) 1984 by Paladin'
03680           DEFB    0AH
03690           DEFW    0AH                     '
03700           DEFM                            <CLEAR><SHIFT><Z> - to program keys'
03710           DEFB    0AH                     '
03720           DEFB    0DH                     '
03730 KEYMSG    DEFM                            <F1> - LIST     <SHIFT><F1> - DIR :0'
03740           DEFB    0AH                     '
03750           DEFM                            <F2> - EDIT     <SHIFT><F2> - DIR :1'
03760           DEFB    0AH                     '
03770           DEFM                            <F3> - RUN      <SHIFT><F3> - SYSTEM "'
03780           DEFB    0AH                     '
03790           DEFB    0DH                     '
03820 PRMTBL    DEFB    80H                     ;HEADER BYTE
03830           DEFB    34H                     ;STRING,1STOK,4 BYTES
03840           DEFM    'FILE'
03850 FILRSP    DEFB    00H                     ;RESPONSE BYTE
03860           DEFW    FILNAM                  ;VECTOR LOC
03870           DEFB    54H                     ;FLAG,1STOK,4 BYTES
```

Listing continued

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```
03880           DEFM    'PROG'
03890           DEFB    00H
03900           DEFW    PRGFLG          ;VECTOR
03910           DEFB    00H             ;TABLE TERMINATOR
03920 ;
03930 ;
03940 ;
03950 ;
03960 ;         ***** This is the actual filter *****
03970 FENTRY    JR      START           ;SKIP LINKAGE
03980 OLDMEM    DEFW    $-$             ;LAST BYTE USED BY FILTER
03990           DEFB    04H             ;4 CHARS IN NAME
04000           DEFM    'PF30'
04010 MODDCB    DEFW    $-$             ;HOLDS NEXT MODULE ADDR
04020           DEFW    $-$             ;REQ'D BY TRSDOS
04030 OUTPTR    DEFW    0000H           ;FUNCTION OUTPUT PTR
04040 LOOKTB    DEFB    81H             ;<F1>
04050           DEFB    82H             ;<F2>
04060           DEFB    83H             ;<F3>
04070 LOOKHI    DEFB    91H             ;<SF1>
04080           DEFB    92H             ;<SF2>
04090           DEFB    93H             ;<SF3>
04100 ;
04110 VECTAB    DEFW    F1              ;VECTOR TABLE
04120 REL0      EQU     $-2
04130           DEFW    F2
04140 REL1      EQU     $-2
04150           DEFW    F3
04160 REL2      EQU     $-2
04170           DEFW    SF1
04180 REL3      EQU     $-2
04190           DEFW    SF2
04200 REL4      EQU     $-2
04210           DEFW    SF3
04220 REL5      EQU     $-2
04230           DEFW    $-$
04240 ;
04250 ;
04260 START     JR      C,GETBYT        ;THIS IS FOR GET ONLY
04270 NXTMOD    LD      IX,(MODDCB)     ;IX-> NEXT MOD DCB
04280 REL6      EQU     $-2
04290           LD      A,CHNIO         ;SVC, DO NEXT MODULE
04300           RST     28H
04310           RET
04320 ;
04330 GETBYT    LD      A,$-$           ;GET FUNCTION FLAG
04340 OUTFLG    EQU     $-1             ;FLAG LABEL
04350           OR      A               ;TEST IT
04360           JR      NZ,OUTFUN       ;NZ= FUNCTION IN PROGRESS
04370 NXTCAL    CALL    NXTMOD          ;ELSE GET INPUT
04380 REL7      EQU     $-2
04390           RET     NZ              ;NZ= NO KEY
04400           BIT     7,A             ;TEST INPUT BYTE
04410           RET     Z               ;Z= NOT > 127
04420           CP      0FAH            ;<CLR><SHFT><Z>?
04430 GETJMP    JR      Z,GETINP        ;IF SO
04440           LD      C,A             ;SAVE BYTE
04450           PUSH    BC              ;SAVE CHAR & DIREC
04460           LD      HL,0002H        ;OFFSET/VECTOR
04470           LD      DE,VECTAB       ;DE-> VECTOR TABLE
04480 REL8      EQU     $-2
04490           CALL    CKFUN           ;CK FUNCTIONS
04500 REL9      EQU     $-2
04510           POP     BC              ;GET CHAR & DIREC
04520           JR      Z,FUNFND        ;IF SO, DE-> VECTOR
04530 NOCMD     LD      A,C             ;GET ORIG CHAR
04540           CP      A               ;SET Z FLAG
04550           RET                     ;GO BACK
04560 ;
04570 ;
04580 FUNFND    EX      DE,HL           ;HL-> VECTOR LSB
04590           LD      A,(HL)          ;GET LSB
04600           INC     HL
04610           LD      H,(HL)          ;GET MSB
04620           LD      L,A             ;HL-> STRING
04630           LD      A,(HL)          ;GET 1ST CHAR
04640           CP      0DH             ;CR?
04650           JR      Z,NOCMD         ;Z= NO STRING
04660           LD      (OUTPTR),HL     ;ELSE SAVE PTR
04670 RELA      EQU     $-2
04680           LD      HL,OUTFLG       ;HL-> OUT FLAG
04690 RELB      EQU     $-2
04700           SET     0,(HL)          ;SET TO NZ
04710 ;
04720 OUTFUN    LD      HL,(OUTPTR)     ;GET OUTPUT PTR
04730 RELC      EQU     $-2
04740           LD      A,(HL)          ;GET A CHAR
04750           CP      0DH             ;END ?
04760           JR      Z,FUNDUN        ;Z= DONE
04770           CP      '|'             ;CR FLAG?
04780           JR      NZ,NOTCR        ;NZ= NO
04790           LD      A,0DH           ;ELSE MAKE CR
04800 NOTCR     INC     HL              ;HL-> NEXT CHAR
04810           LD      (OUTPTR),HL     ;SAVE PTR
04820 RELD      EQU     $-2
04830           CP      A               ;SET Z
04840           RET                     ;RET W CHAR
04850 ;
04860 FUNDUN    LD      HL,OUTFLG       ;HL-> FLAG
04870 RELE      EQU     $-2
04880           RES     0,(HL)          ;RESET SAME
04890           JR      NXTMOD          ;GO GET A KEY
04900 ;
04910 ;
04920 ;
04930 CKFUN     LD      (OFFSET),HL     ;SAVE OFFSET AHEAD
04940 RELF      EQU     $-2
04950           LD      HL,LOOKTB       ;HL-> LOOK UP TABLE
04960 REL10     EQU     $-2
04970           LD      B,6             ;6 POSSIBLES
04980 CKLOOP    CP      (HL)            ;CK ONE
04990           RET     Z               ;Z= FOUND
05000           INC     HL              ;HL-> NEXT
05010           EX      DE,HL           ;SWAP PTRS
05020           PUSH    BC              ;SAVE COUNT
05030           LD      BC,$-$          ;GET OFFSET
05040 OFFSET    EQU     $-2
05050           ADD     HL,BC           ;ADD TO POINTER
05060           POP     BC              ;GET COUNT
05070           EX      DE,HL
05080           DJNZ    CKLOOP
05090           OR      A               ;SET NZ
05100           RET                     ;DONE
05110 ;
05120 ;
05130 NOPROG    EQU     $
05140 ;
05150 ;
05160 GETINP    LD      B,4             ;GET CSR POSN
05170           LD      A,VDCTL
05180           RST     28H
05190           LD      (CSRPOS),HL     ;SAVE IT AHEAD
05200 REL23     EQU     $-2
05210 ;
05220 ;*****************************************************************
05230 ;         The following code saves the contents of video line 23.
05240 ;         This option of @VDCTL is only available under 6.2.x.
05250 ;
05260           IFT     DOSVER.EQ.62    ;6.2 ONLY
05270 ;
05280           LD      B,9             ;LINE XFR FUNCTION
05290           LD      C,1             ;SCREEN-> BUFFER
05300           LD      H,23            ;LINE 23
05310           LD      DE,VDBUFF       ;DE-> BUFFER
05320           LD      A,VDCTL
05330           RST     28H
```

Listing continued

Listing continued

```
05340 ;
05350         ENDIF
05360 ;*****************************************************
05370 ;
05380         LD      HL,1700H        ;CSR TO LINE 23
05390         LD      B,3
05400         LD      A,VDCTL
05410         RST     28H             ;DO IT
05420         LD      HL,KYMSG        ;HL-> 1EH"Key? "
05430 REL11   EQU     $-2
05440         LD      A,DSPLY
05450         RST     28H
05460         LD      HL,NXTCAL       ;HL-> NXTMOD CALL
05470 REL12   EQU     $-2
05480         LD      (HL),0C3H       ;SET JP OPCODE
05490 KEYLP   LD      A,KEY
05500         RST     28H
05510         CP      80H             ;<BREAK>?
05520         JP      Z,GETOUT        ;IF SO, QUIT
05530 REL25   EQU     $-2
05540         LD      DE,USRBF1       ;DE-> USER BUFFERS
05550 REL13   EQU     $-2
05560         LD      HL,0050H        ;80 BYTES/BUFFER
05570         LD      (OFFSET),HL     ;SAVE IN CKFUN
05580 REL21   EQU     $-2
05590         LD      HL,LOOKHI
05600 REL22   EQU     $-2
05610         LD      B,03H           ;3 POSSIBLES
05620         CALL    CKLOOP          ;VERIFY INPUT
05630 REL14   EQU     $-2
05640         JR      NZ,KEYLP        ;IF NOT VALID
05650         PUSH    AF              ;ELSE SAVE KEY
05660         PUSH    DE              ;& BUFFER PTR
05670         PUSH    AF              ;KEY AGAIN
05680         LD      HL,CLLMSG       ;HL->1D'->'03H
05690 REL24   EQU     $-2
05700         LD      A,DSPLY
05710         RST     28H
05720         POP     AF              ;DO IT
05730         LD      DE,DEFVEC       ;GET KEY
05740 REL15   EQU     $-2             ;DE-> DEFAULT VECS
05750         LD      HL,0002H        ;2 BYTES/VECTOR
05760         PUSH    HL              ;SAVE OFFSET
05770         CALL    CKFUN           ;DE-> VECTOR(KEY)
05780 REL16   EQU     $-2
05790         POP     HL              ;GET OFFSET
05800         PUSH    DE              ;SAVE DEF VEC PTR
05810         LD      DE,VECTAB       ;DE-> VECTOR TBL
05820 REL17   EQU     $-2
05830         CALL    CKFUN           ;DE-> VECTOR(KEY)
05840 REL18   EQU     $-2
05850         LD      (VECADD),DE     ;SAVE AHEAD
05860 REL19   EQU     $-2
05870         POP     HL              ;HL-> DEFVEC(KEY)
05880         LD      A,(HL)          ;GET LSB OLD VEC
05890         LD      (DE),A          ;SAVE LSB OLDVEC
05900         INC     HL              ;HL-> MSB OLDVEC
05910         INC     DE              ;DE-> MSB VECTAB
05920         LD      A,(HL)          ;GET MSB
05930         LD      (DE),A          ;SAVE MSB
05940         LD      BC,4E00H        ;78 CHARS, NONE YET
05950         POP     HL              ;HL-> BUFFER
05960         PUSH    HL              ;SAVE IT AGAIN
05970 STRLP   LD      A,KEY           ;KEY SVC
05980         RST     28H
05990         CP      88H             ;<clr><left>?
06000         JR      Z,BKSPC
06010         CP      0DH             ;CR?
06020         JR      Z,ENDINP
06030         CP      80H             ;<BREAK>?
06040         JR      Z,BREAK
06050         LD      (HL),A          ;ELSE SAVE CHAR
06060         INC     HL              ;BUMP BUF PTR
```

Listing continued

Circle 151 on Reader Service card.

CONVERT YOUR TRS-80 MODEL III OR 4 INTO A

DEVELOPMENT SYSTEM

Now you can develop Z-80 based, *stand-alone* devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system.

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When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/assembler s debug and trace programs to check out both the *hardware and the software*. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate s PROM PROGRAMMER to copy the program into a PROM. With this PROM, and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact. Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2" x 5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758,2508(8K), 2716,2516(16K), 2532(32K), as well as the new electrically alterable 2816 and 48016(16K EEPROMs).

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Listing continued

```
06070           INC     C               ;BUMP # CHARS INP
06080           PUSH    BC              ;SAVE COUNTS
06090           CP      20H             ;CTL?
06100           JR      NC,OKASIS
06110           PUSH    AF              ;SAVE CHAR
06120           LD      C,0             ;NULL SAYS DSP CTL
06130           LD      A,DSP           ;@DSP
06140           RST     28H             ;SET TO DSP CTL CHAR
06150           POP     AF
06160 OKASIS    LD      C,A             ;CHAR->C
06170           LD      A,DSP           ;FOR *DO OUT
06180           RST     28H
06190           POP     BC              ;GET COUNTS
06200           DJNZ    STRLP           ;LOOP
06210 BKSPC     LD      A,C             ;GET # CHARS INP
06220           OR      A               ;TEST IT
06230           JR      Z,STRLP         ;IF NONE
06240           PUSH    BC              ;ELSE SAVE COUNTS
06250           LD      C,08H           ;ASCII BACKSPACE
06260           LD      A,DSP           ;TO *DO
06270           RST     28H
06280           POP     BC              ;GET COUNTS
06290           INC     B               ;BUMP # LEFT
06300           DEC     C               ;ONE LESS INP
06310           DEC     HL              ;BACK UP IN BUFFR
06320           JR      STRLP           ;LOOP
06330 ;
06340 ;
06350 BREAK     LD      C,0             ;NO INPUT
06360           LD      A,0DH           ;END OF INPUT
06370           POP     HL              ;HL-> BUFFR START
06380           PUSH    HL              ;SAVE IT
06390 ENDINP    LD      (HL),A          ;SAVE CR
06400           POP     HL              ;HL-> START
06410           POP     AF              ;GET KEY
06420           LD      B,A             ;SAVE IN B
06430           LD      A,C             ;GET # CHARS INP
06440           OR      A               ;TEST
06450           JR      Z,GETOUT        ;Z=NO INPUT
06460           LD      DE,$-$          ;GET VECTOR ADDR
06470 VECADD    EQU     $-2             ;STUFFED BY PREV CODE
06480           EX      DE,HL           ;DE-> STRING BUFFER
06490           LD      (HL),E          ;STORE LSB ADDRESS
06500           INC     HL              ;HL-> MSB VECTOR
06510           LD      (HL),D          ;SAVE MSB
06520 GETOUT    LD      HL,NXTCAL       ;HL-> NXTMOD CALL
06530 REL1A     EQU     $-2
06540           LD      (HL),0CDH       ;RESET CALL
06550 ;
06560 ;*****************************************************************
06570 ;       This restores line 23, Version 6.2.x only!!!
06580 ;
06590           IFT     DOSVER.EQ.62
06600 ;
06610           LD      DE,VDBUFF       ;DE-> BUFFER
06620           LD      B,9             ;XFR
06630           LD      C,0             ;BUFFER-> SCREEN
06640           LD      HL,1700H        ;LINE 23
06650           LD      A,VDCTL
06660           RST     28H
06670 ;
06680           ENDIF
06690 ;*****************************************************************
06700 ;
06710 ;*****************************************************************
06720 ;       For TRSDOS 6.1.x, clear line 23 after input
06730 ;
06740           IFF     DOSVER.EQ.62    ;IF NOT 6.2.X
06750 ;
06760           LD      HL,CLRMSG       ;HL-> 1D1E03H
06770           LD      A,DSPLY         ;@DSP
06780           RST     28H             ;DO IT
06790 ;
06800           ENDIF
06810 ;*****************************************************************
06820 ;
06830           LD      HL,$-$          ;GET CSR POSN
06840 CSRPOS    EQU     $-2
06850           LD      B,3             ;RESET IT
06860           LD      A,VDCTL
06870           RST     28H
06880           OR      1               ;RET NZ STATUS
06890           LD      A,0             ;RET 0
06900           RET                     ;DONE
06910 ;
06920 ;
06930 ;
06940 KYMSG     DEFB    1EH
06950           DEFM    'Key (shifted)? '
06960           DEFB    03H
06970 ;
06980 CLLMSG    DEFB    1DH             ;RE-START LINE
06990           DEFM    '->'
07000           DEFB    1EH
07010           DEFB    03H             ;ETX
07020 ;
07030 ;*****************************************************************
07040 ;       Line 23 clear message for TRSDOS 6.1.x
07050 ;
07060           IFF     DOSVER.EQ.62    ;IF NOT 6.2
07070 ;
07080 CLRMSG    DEFB    1DH
07090           DEFB    1EH
07100           DEFB    03H
07110 ;
07120           ENDIF
07130 ;*****************************************************************
07140 ;
07150 USRBF1    DEFS    256
07160 DEFVEC    DEFW    F1
07170 REL1B     EQU     $-2
07180           DEFW    F2
07190 REL1C     EQU     $-2
07200           DEFW    F3
07210 REL1D     EQU     $-2
07220           DEFW    SF1
07230 REL1E     EQU     $-2
07240           DEFW    SF2
07250 REL1F     EQU     $-2
07260           DEFW    SF3
07270 REL20     EQU     $-2
07280 ;
07290 ;
07300 F1        DEFM    'List '
07310           DEFB    0DH
07320 F2        DEFM    'Edit '
07330           DEFB    0DH
07340 F3        DEFM    'Run|'
07350           DEFB    0DH
07360 SF1       DEFM    'Dir :0|'
07370           DEFB    0DH
07380 SF2       DEFM    'Dir :1|'
07390           DEFB    0DH
07400 SF3       DEFM    'System '
07410           DEFB    0DH
07420 ;
07430 ;
07440 LAST      EQU     $
07450 ;
07460           END     ENTRY
```

End

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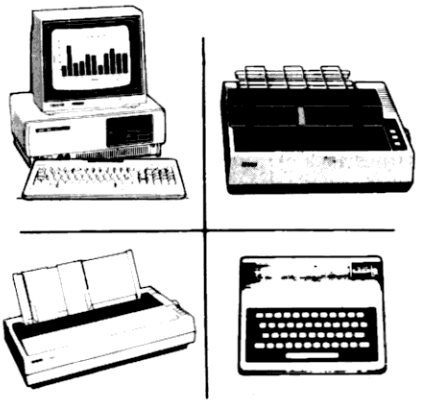

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UO-LISP implements and runs large-scale artificial intelligence programs: expert systems, symbolic algebra, robotics, and games. Its optimizing compiler lets you run large programs faster. Compiled programs also take about half the space of interpreted code.

The system comes complete with reference manual and programs that include compiling, debugging, program development, extended arithmetic, document processing, editing, and translator writing.

UO-LISP 2.0 ($125) requires a Model 4/4P with two drives and Tandy CPM+ or Montezuma CP/M. UO-LISP 3.0 ($150) runs on the Models 1000 and 2000 with MS-DOS 2.0 or higher, 128K, and two disk drives. For more information, contact Northwest Computer Algorithms, P.O. Box 90995, Long Beach, CA 90809, 213-426-1893.

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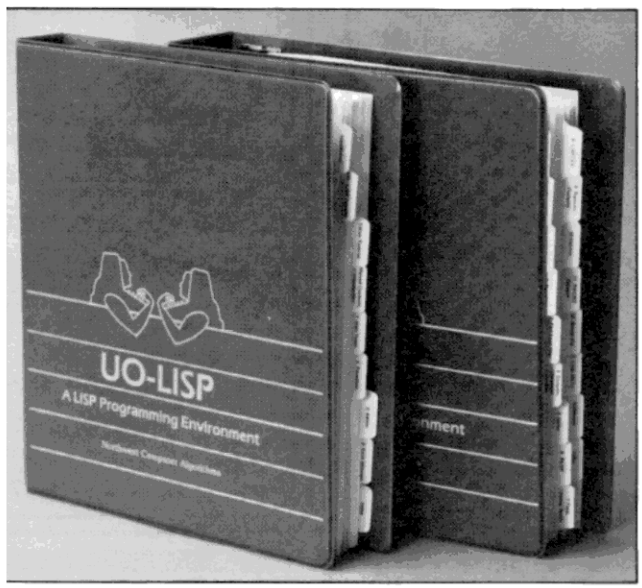

UO-LISP is now available for the Models 4/4P, 1000, and 2000.

Rename Your Keys

Unikey for the Model 4 from Salsbury Associates lets you assign over 80 Basic key words and phrases to the keyboard. At the touch of the key you can type words and phrases directly into your program.

Examples of key words are RIGHT$(, ON ERROR GOTO, and LPRINT. A help screen with all keystroke combinations is available. Unikey also inserts the mandatory spaces that follow the key words.

In addition, the program lets you program the three Model 4 function keys with up to 80 ASCII characters of your choice.

Unikey sells for $19.95 (plus $1.50 for postage). For further information, contact Salsbury Associates Inc., 610 Madam Moore's Lane, New Bern, NC 28560, 919-638-4456.

Circle 556 on Reader Service card.

A New DOS

AlphaBit Communications Inc. offers a new version of MULTIDOS for the Model 4/4P called MULTIDOS 64/80. It acts like a Model III DOS but supports Model 4 features. It runs software written for the Model III, but not software designed for TRSDOS 6.

You can get either a 64- or 80-character screen. It loads the ROM image on your 4P automatically. The MEMDISK command uses the second 64K of memory as an internal disk drive, so program overlays, Basic, or utility programs are instantly available.

MULTIDOS 64/80 has a rewritten Basic, which leaves over 41,000 bytes of memory free and is faster than Microsoft Basic. The Basic includes such enhancements as a packer and unpacker.

For more information, contact AlphaBit Communications Inc., 13349 Michigan Ave., Dearborn, MI 48126, 313-581-2896.

Circle 554 on Reader Service card.

Trucking Along

Tecnomics' Utilifleet, for the Models III and 4/4P and the IBM PC, lets you monitor your fleet so each vehicle runs at maximum efficiency.

Utilifleet monitors fuel, scheduled maintenance, repairs, insurance, licenses, depreciation, and two other costs that you can define. The result is a cost-per-mile analysis for each vehicle and a bar-graph comparison of all vehicles.

Utilifleet costs $395, and you need 48K and one disk drive. For more information, contact Tecnomics, Microcomputer Software, 100 Ardmore St., Blacksburg, VA 24060, 800-368-3532.

Circle 551 on Reader Service card.

Riding Again

Rochkind Software's business application language Ride runs now on the Models 16 and 6000 under XENIX.

Ride is a high-level language that includes expanded data processing functions. Programmers do not have to choose a programming language and a separate data base system.

Ride retails for $495. For more information, contact Rochkind Software Co., 3080 Valmont Road, Boulder, CO 80301, 303-442-4981.

Circle 555 on Reader Service card.

Emulated Terminals

TELETERM-EM from Telexpress Inc. is available for the Models II, III, 4, 12, 16, 1000, 1200, and 2000. The package offers emulation of many terminal types and operates in many networks.

It performs error-free disk-to-disk file transfer among all models and brands equipped with TELETERM-EM. It includes its own protocol and supports XModem. File upload/download works with any asynchronous system, and in the unattended operation mode it permits automatic dial and log-in. The integral text editor functions in both on-line and off-line modes and the transparent print mode lets you use your computer as a printer termi-

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Tandy 1000

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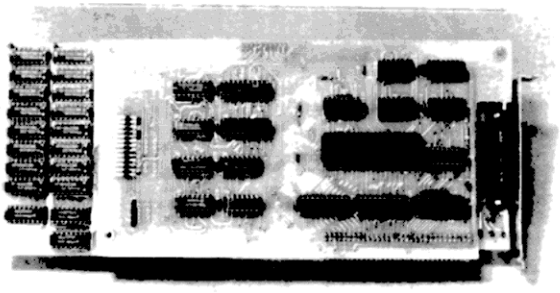

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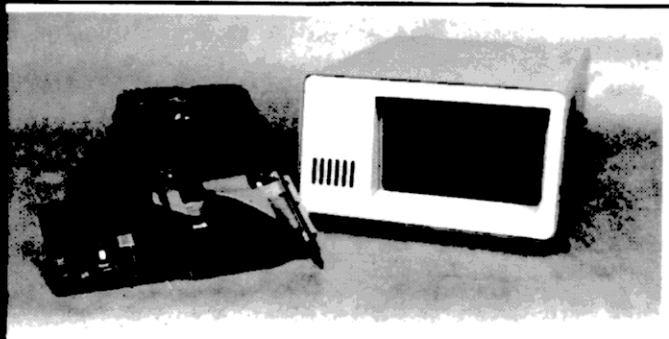

Tandy 1000 Hard Drives

HDS Hard Drives for the Tandy 1000 allow booting directly from the Hard Drive using the Tandy DOS. All units are complete with controller, ready to plug in and use. The Internal Hard Drive Units replace the top disk drive inside the 1000, or request an external unit for only $150. more.

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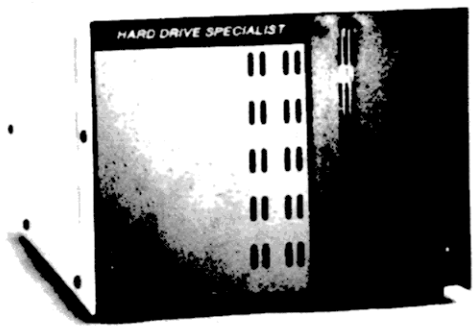

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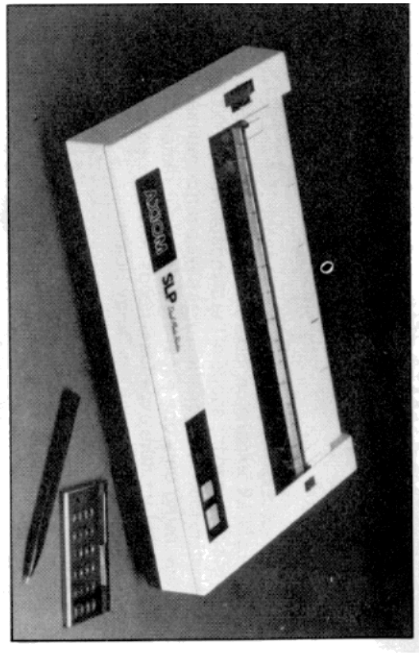

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nal for another system.

TELETERM-EM is $195 for the Models III, 4, 1000, 1200 and 2000 and $225 for the Models II, 12, and 16. Contact Telexpress Inc. (P.O. Box 217, Willingboro, NJ 08046, 609-877-4900) for more details.

Circle 553 on Reader Service card.

Portable Printer

The SLP (Super Little Printer) from Axiom Co. is a dot-matrix printer that fits into a desk drawer or briefcase.

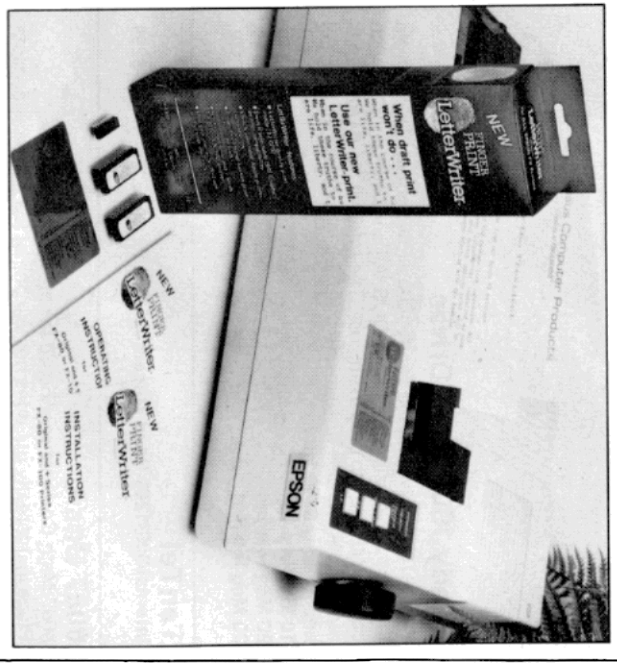
Some of the SLP's features are near letter-quality printing, higher draft speed mode, super- and subscript, underlining, dot addressable and IBM-PC compatible graphics, quiet operation, and choice of parallel or serial direct-connect interfaces.

The SLP is $299, with quantity discounts available. For more details, contact Axiom Co., 1014 Griswold Ave., San Fernando, CA 91340, 818-365-9521.

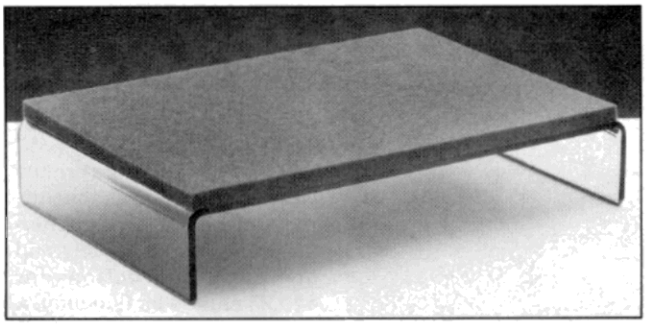
Circle 557 on Reader Service card.

Upgraded Letters

Epson FX users can now upgrade to near letter-quality print for $79.95. The Finger Print LetterWriter NLQ upgrade kit from Dresselhaus Computer Products gives you four times the resolution of standard printing and no visible dots. It also makes the printer compatible with programs that use the IBM graphics printer's special character set. You can select the NLQ mode via software or by tapping the printer panel buttons.



LetterWriter gives your Epson FX printer NLQ print.



The Howard PS-1X printer stand has noise-reducing top and cork treads.

Finger Print LetterWriter is a kit of replacement ROMs for original and Plus series FX-80 and FX-100 printers. For further information, contact Dresselhaus Computer Products, 837 E. Alosta Ave., Glendora, CA 91740, 818-914-5831.

Circle 559 on Reader Service card.

Stand Your Printer Up

The Howard PS-1X Printer Stand from Howard Medical Computers reduces the noise and vibration from your printer.

The stand is made of gray plexiglass with a foam top that absorbs noise and vibration. It has a thin tread of cork under the feet.

The dimensions are 16½ inches wide, 11 inches deep, and 2⅞ inches high, and it weighs 2½ pounds. The stand costs $39.50 plus $3 shipping. For more information, contact Howard Medical Co., Box 2, Chicago, IL 60690, 312-278-1440.

Circle 565 on Reader Service card.

Sparkling Computer

The Read/Right Microcomputer Cleaning Kit ($34.95) from The Texwipe Co. contains products to clean the main areas of the computer—the head, screen, and the housing. The kit is available for 5¼- and 8-inch disks and lets you clean read/write heads of single- and dual-sided drives interchangeably with the same disk for up to 15 separate cleanings.

It also includes a Static Stopper pump spray, special Static Stopper cloth, datawipes, CRT terminal cleaning pads, and office equipment cleaning pads.

Read/Right Microcomputer Cleaner Kit makes your computer sparkle.

Circle 476 on Reader Service card.

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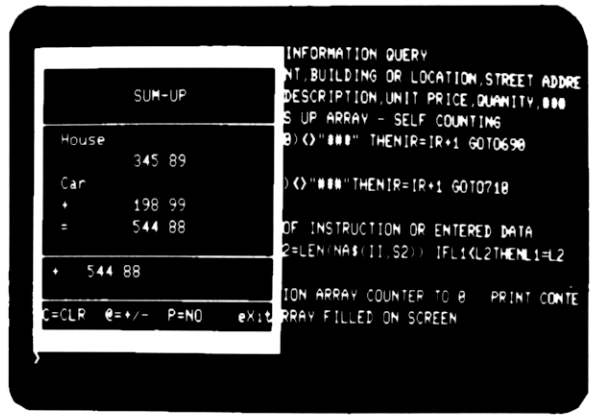
use SUM-UP instead.



MODEL 4 VERSION HAS 80 X 24 CHARACTER SCREEN

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- works with your word processor, spreadsheet, or any application program
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- Comes on mini MULTIDOS or transfers to the DOS of your choice.

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GOT A MODEL 4? TRY MULTIDOS 80/64

Send for information on this unique DOS for your Model 4. This is a totally redesigned system that gives you a choice of 64 or 80 characters, use of the second 64K memory, better BASIC with 41K free space, and more. For Model 4P owners, run Model III software and never load MODELA/III file again! MULTIDOS 80/64 runs software written for the Model III...does not run TRSDOS 6 software.

MULTIDOS 80/64 now with 32K print spooler utility $99.95

AlphaBit Communications, Inc.

☎call (313) 581-2896

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Dearborn, Michigan 48126

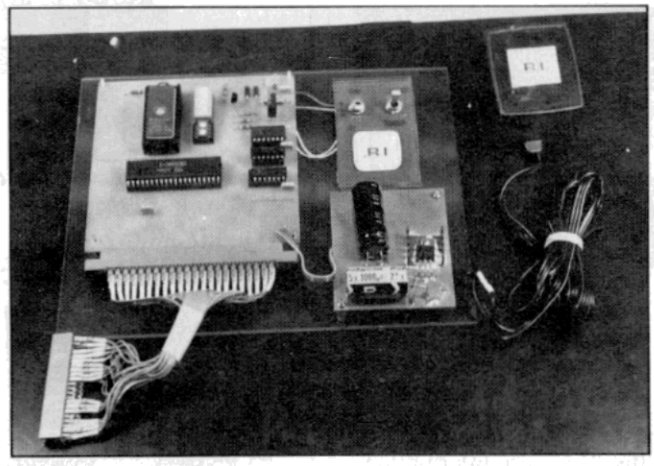
For more information, contact Read/Right Division, The Texwipe Co., 650 E. Crescent Ave., P.O. Box 575, Upper Saddle River, NJ 07458, 201-327-9100.
Circle 552 on Reader Service card.

Body Fitness

The Computer Fitness Program ($145) for the Model 4 includes an aerobic screening analysis procedure program and a body fat percentage program.

The aerobics program evaluates your VO2MAX, a measurement of the body's ability to supply oxygen to the muscle cells. The program rates your VO2MAX against standards and then recommends an exercise program. It provides a printout of all input and output and an exercise program log sheet.

To use the aerobics program, you need an ergometer to measure work and a heart monitor to read your pulse rate.



Program your own EPROMs with the EP8401.

The body fat program lets you input skinfold measurements and outputs percentages. The final output is a personal printout and ratings. For this program you need a metric caliper. For details, contact Computer Bio Center, 144 Bedford Road, Armonk, NY 10504, 914-273-3454.
Circle 563 on Reader Service card.

Eproming an Eprom

Robotron Industries offers an EPROM programmer kit for the Model III. The EP8401 lets you program the 2716, 2732, 2732A, and 2764 EPROMs. It writes machine code directly to the EPROM or reads, copies, and modifies existing programs stored on the EPROM.

It can write more than one program to an EPROM starting at any address. It also has an erase verify routine which confirms if an EPROM is blank or gives a checksum for programmed EPROMs.

The kit comes with a printed circuit board, all components, menu-driven software, interface cable, and assembly and operating instructions for $49.95 plus $4 for handling. A regulated +5 and 30 volt power supply is required and also available as a kit for $14.95. For more information, contact Robotron Industries Inc., 1417 Wauwatosa Ave., Milwaukee, WI 53213.
Circle 560 on Reader Service card.

Easy Does It

Word Processing Simplified—SuperSCRIPSIT ($19.95) is an instruction manual on SuperScripsit for the Models III and 4 with simple exercises and review quizzes.

The book also includes a quick reference guide for executing commands and sev-

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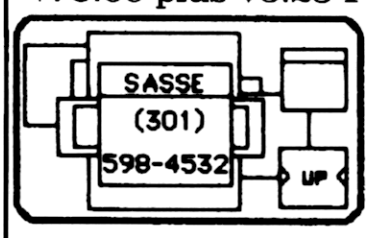
TM**SASSE FREEDOM FILE FILING SYSTEM**

SASSE the first full application program designed around the Model III that takes full advantage of the windowing technique. ***SASSE*** has word-processing & multi-tasking capabilities. It enables the operator to (1) sort, print, edit and search different files simultaneously, (2) call the HELP or OPERATION MANUAL in the midst of an operation, (3) stack 8 windows of various information at one time. $75.00 plus $3.25 P & H.



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FULL SCREEN EDITOR
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With a few simple keystrokes, you position the cursor anywhere on the screen and key in your desired changes simply and quickly. The somewhat slow BASIC edit feature is no longer requred. Go directly to the problem and make your changes. Grab a problem program line and make it an immediate statement that you entered for debugging and make it part of your program. Eliminate excessive keystrokes and save time. (Requires 2 drives to install)

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eral pages on computer language literacy. The book can replace the instruction manual and cassette tapes that come with the software.

For more information, contact Kelly Enterprises, P.O. Box 247, Holt, MI 48842.

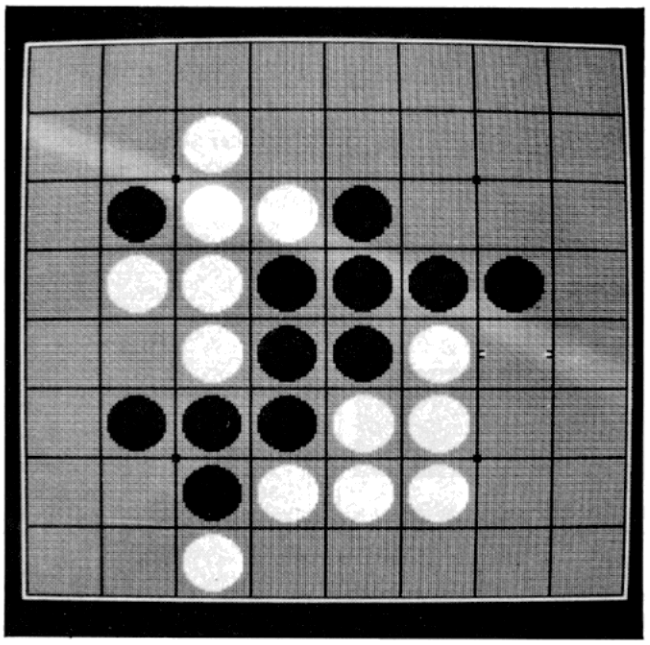
Circle 558 on Reader Service card.

Brain Teaser

Tournament Reversi for the Models I, III, and 4/4P is a game of Othello. The game uses standard block graphics with high quality resolution if you use a hi-res board.

The game uses artificial intelligence and thinks on the opponent's time to provide an instant response except at the higher skill levels. You can take moves back, the computer can suggest a move, and you can view legal and test moves. The price is $39.95. For details, contact Micro-Labs Inc., 902 Pinecrest, Richardson, TX 75080, 214-235-0915.

Circle 561 on Reader Service card.



Tournament Reversi, a game of Othello for your Model I/III/4/4P, uses artificial intelligence techniques.

Cards upon Cards

Ultimate Software's program Cardex ($39) lets you print Rolodex file cards on your Models III and 4. It prints from one to nine lines of data on fan-fold cards.

Cardex consists of four programs: a sort, a main menu, a file, and a print program. It lets you add, edit, revise, delete, search, and print. You can select from hundreds of print format combinations.

You need 32K, one disk drive, and a printer. For more information, contact Ultimate Software, P.O. Box 1291, Hayden Lake, ID 83835, 208-772-7634.

Circle 562 on Reader Service card.

Reinker

Ebonize, an aerosol ribbon reinker from E.A.P. Co., revitalizes black fabric ribbons for printers, typewriters, and cash registers. It works with cartridge as well as spool ribbons.

Ebonize restores 95 percent of your ribbon's original life and provides darker inking in most cases. It sells for $11.95 and lasts for as many as 20 reinkings. For more information, contact E.A.P. Co., P.O. Box 14, Keller, TX 76248, 817-498-4242.

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ATTENTION TANDY 1000 OWNERS WHO NEED MORE FEATURES, BUT ARE SHORT ON SPARE SLOTS!

Micro Mainframe's **4N1®** Multi-Function card allows you to expand your system memory to 640K by adding up to 512K of RAM, a Serial Port, A DMA controller, and an optional Mouse/Clock Module, while requiring only a single expansion slot.

Prices start as low as $259.95 for the **4N1®** card with 0K RAM, Serial Port, and DMA controller. The Mouse/Clock Module sells for $99.95 and requires the user to purchase the Radio Shack Mouse. Catalog 26-1197 to operate.

HARD DISK SUPPORT

Add a hard disk to your Tandy 1000 with Micro Mainframe's Hard Disk Kit. We provide all of the necessary software so you don't need a degree in Computer Science to make it work.

10 MB Disk with Controller	$495.00
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30 MB Disk with Controller	$995.00

MEMORY PRICE LIST

The following RAM is supplied in a kit of 8 and includes a 90 day guarantee.

64K RAM Upgrade	$20.00
256K RAM Upgrade	$64.00

4N1® PRICE LIST

The **4N1®** products listed below include DMA, Serial Port and the amount of RAM specified. All RAM installed and factory tested includes a Lifetime guarantee. Please add $5.00 for shipping and $3.50 for COD charges.

4N1® Card, 0K RAM	$259.95
4N1® Card, 128K RAM	$319.95
4N1® Card, 256K RAM	$387.95
4N1® Card, 512K RAM	$515.95

SMART TEAM MODEMS **$249.95**

These modems are 100% replacements for the more expensive DC Hayes unit. Capable of both 300/1200 baud operation. Just connect to your serial port, load your terminal program, configure for Hayes, and go for it.

Call us about our 8087 upgrade for your Tandy 1000!

To obtain information about other Micro Mainframe Products, call us at the phone numbers listed below. We have both Voice and Data capability. New Product announcements, Field Engineering bulletins, and digitized video images may be downloaded from our VEX BBS system. You may also enter your order by leaving us a message in our private mailbox. Purchases may be charged on either Master Card or Visa.

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DIFFERENT TRACK

A modem system from 1-800-Floppys for $99.

Get On Line

1-800-Floppys offers a phone modem system for $99 when you buy five boxes of disks starting at $19.90 a box. The package includes a 300-baud modem, software, and a cable.

The modem has auto dial and answer, dial from directory, XModem file transfer, and terminal emulation; the package includes toll-free technical support, and a 30-day trial period.

For more information, contact 1-800-Floppys, 22255 Greenfield Road, Southfield, MI 48075, 800-356-7797.

Circle 564 on Reader Service card.

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Coin Collectors! Unique program uses built-in market value file and prices your U.S. collection. Brochure available. Compu-Quote 6914 Berquist, Canoga Park, CA 91307 (818) 348-3662.

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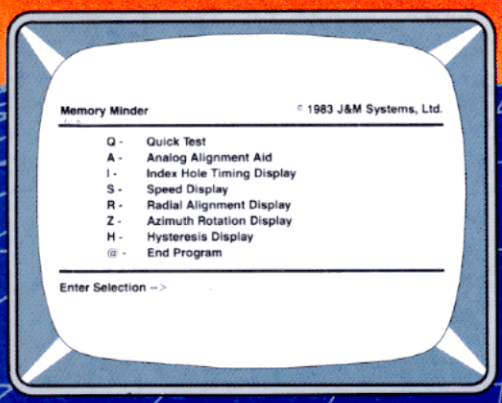
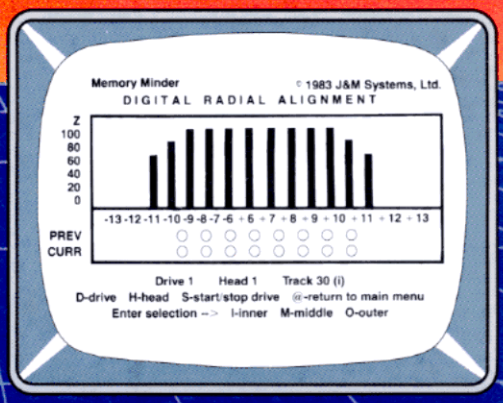
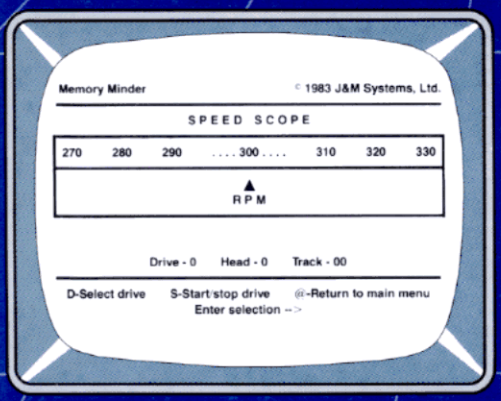


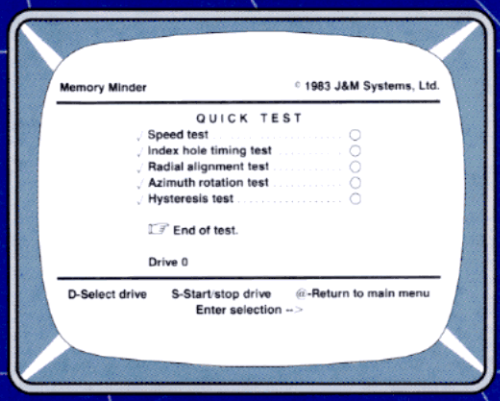
Select any one of seven tests to perform preventive maintenance or to isolate problems. Simple, single-letter commands make MM easy to use! Use MM to align the head, adjust the index hole detector, or adjust the speed.



Use the MM Radial Alignment Test to check the head alignment of your drives. No need for an oscilloscope or other expensive test equipment!



Check the motor speed of your drives. Or, you can even use the Speed Test to adjust the drive speed. No need for any test equipment!



Use the Quick Test to quickly and automatically test five of the most important performance parameters of your drive. Monitor your drives for long term drift. Isolate problems quickly and automatically!

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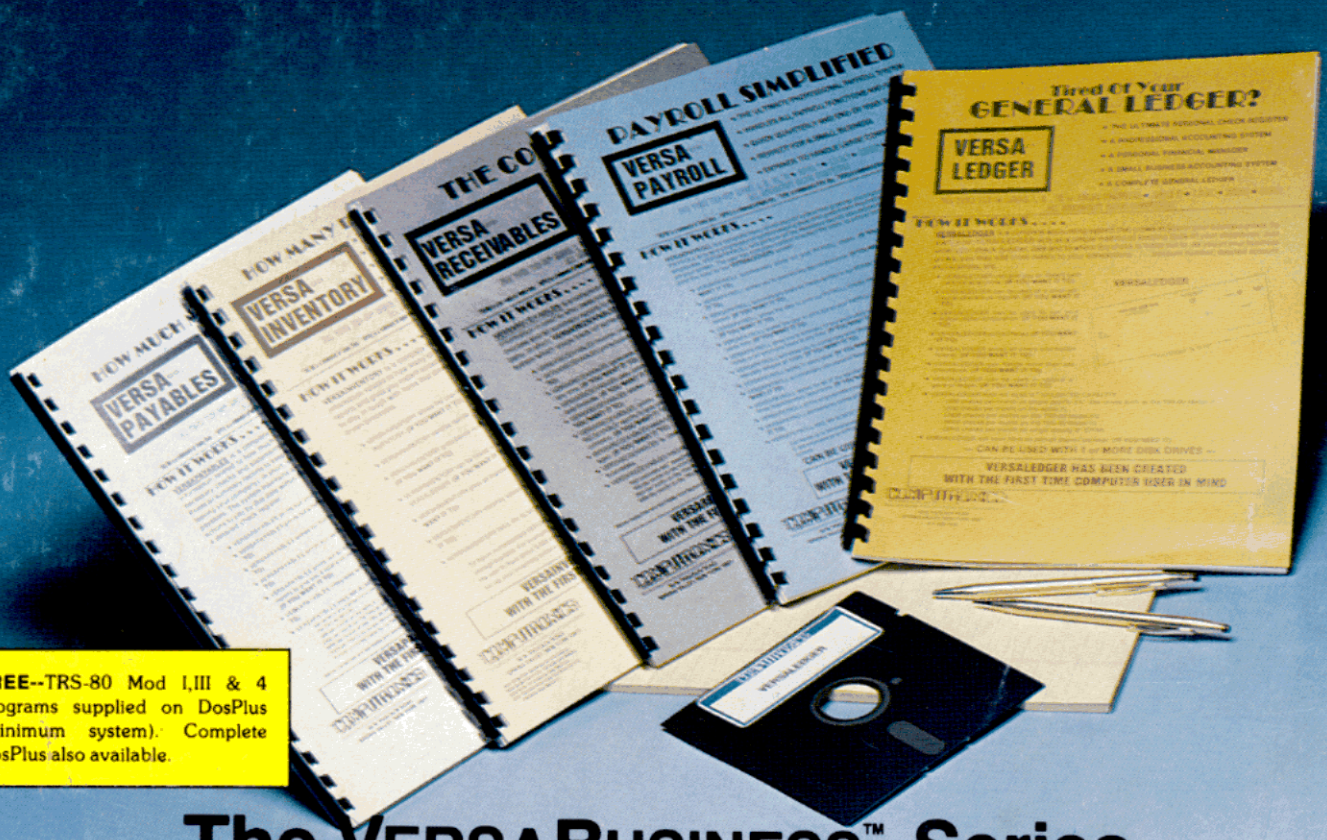

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